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(54) **OUTBOARD MOTOR**

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B63H 20/00 (2006.01)
F02B 61/04 (2006.01)
F01M 11/00 (2006.01)

(52) **U.S. Cl.**
CPC ***B63H 20/28*** (2013.01); ***B63H 20/002*** (2013.01); ***F01M 11/0004*** (2013.01); ***F02B 61/045*** (2013.01); *F01M 2011/0025* (2013.01)

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USPC .... 440/88 L; 123/195 P, 196 A
See application file for complete search history.

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(57) **ABSTRACT**

An outboard motor includes an engine including a crankshaft that is rotatable about a rotation axis extending in an up-down direction, and a crank chamber that houses the crankshaft. The outboard motor includes an oil pan including an oil retaining portion, a cooling water passage disposed along an outer wall surface of the oil retaining portion, an oil recovery passage extending downward from the crank chamber to lead lubricating oil inside the crank chamber to the inside of the oil retaining portion, and a guide member. The guide member includes a shielding portion disposed inside the oil recovery passage so as to be located over an opening of the oil retaining portion, and a guide hole disposed inside the oil recovery passage so as to be located over an inner wall surface of the oil retaining portion. The guide member is configured to guide lubricating oil to the guide hole by the shielding portion and allow lubricating oil to flow down to the inner wall surface of the oil retaining portion from the guide hole.

10 Claims, 15 Drawing Sheets

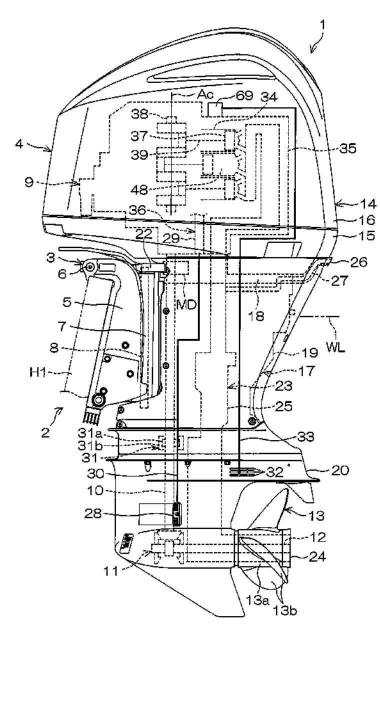
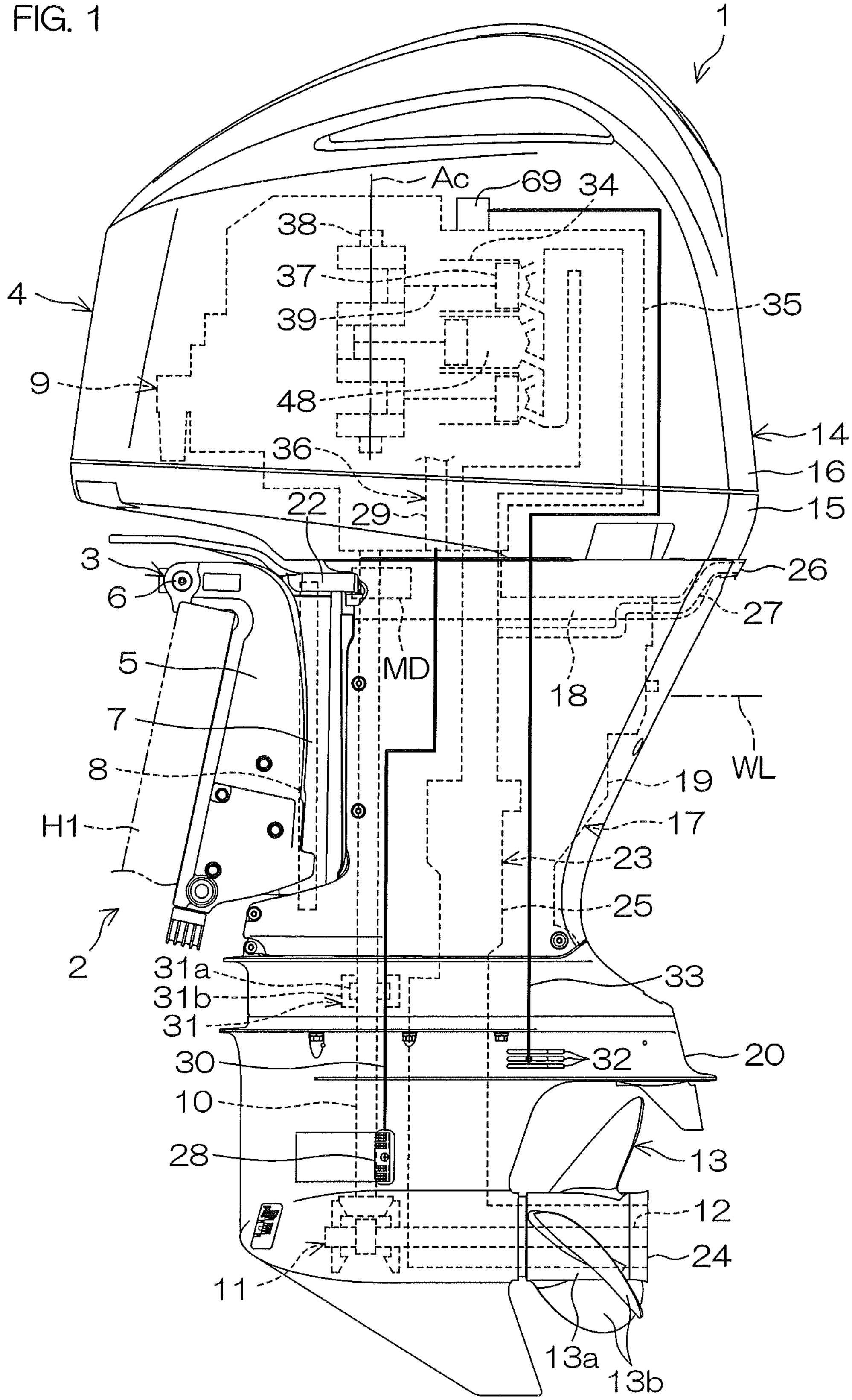


FIG. 1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Ac
69
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38
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4
9
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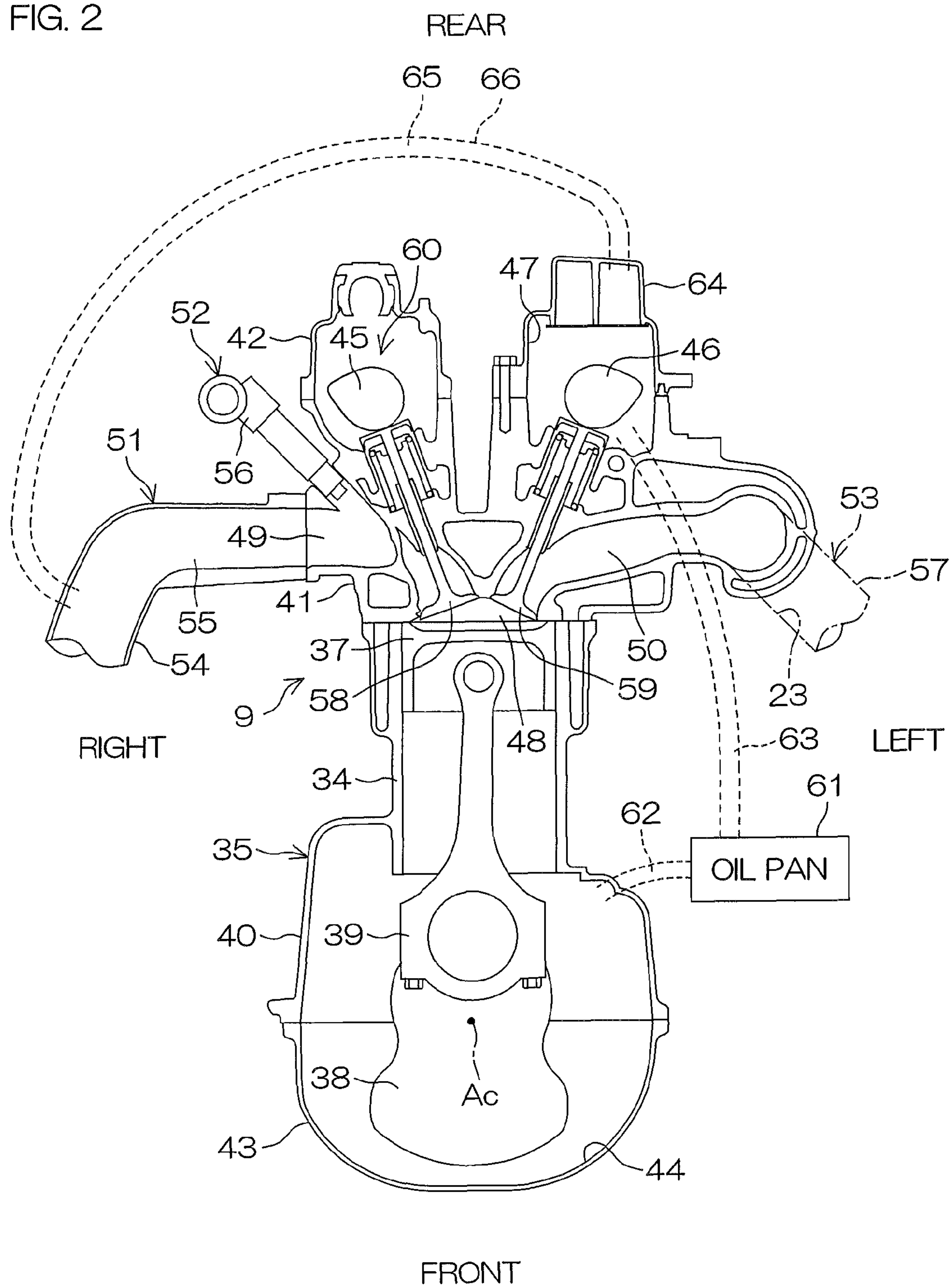
27
5
MD
18
7
WL
8
19
H1
17
23
25
2
31a
33
31b
31
30
32
20
10
13
28
12
24
11
13a
13b

FIG. 2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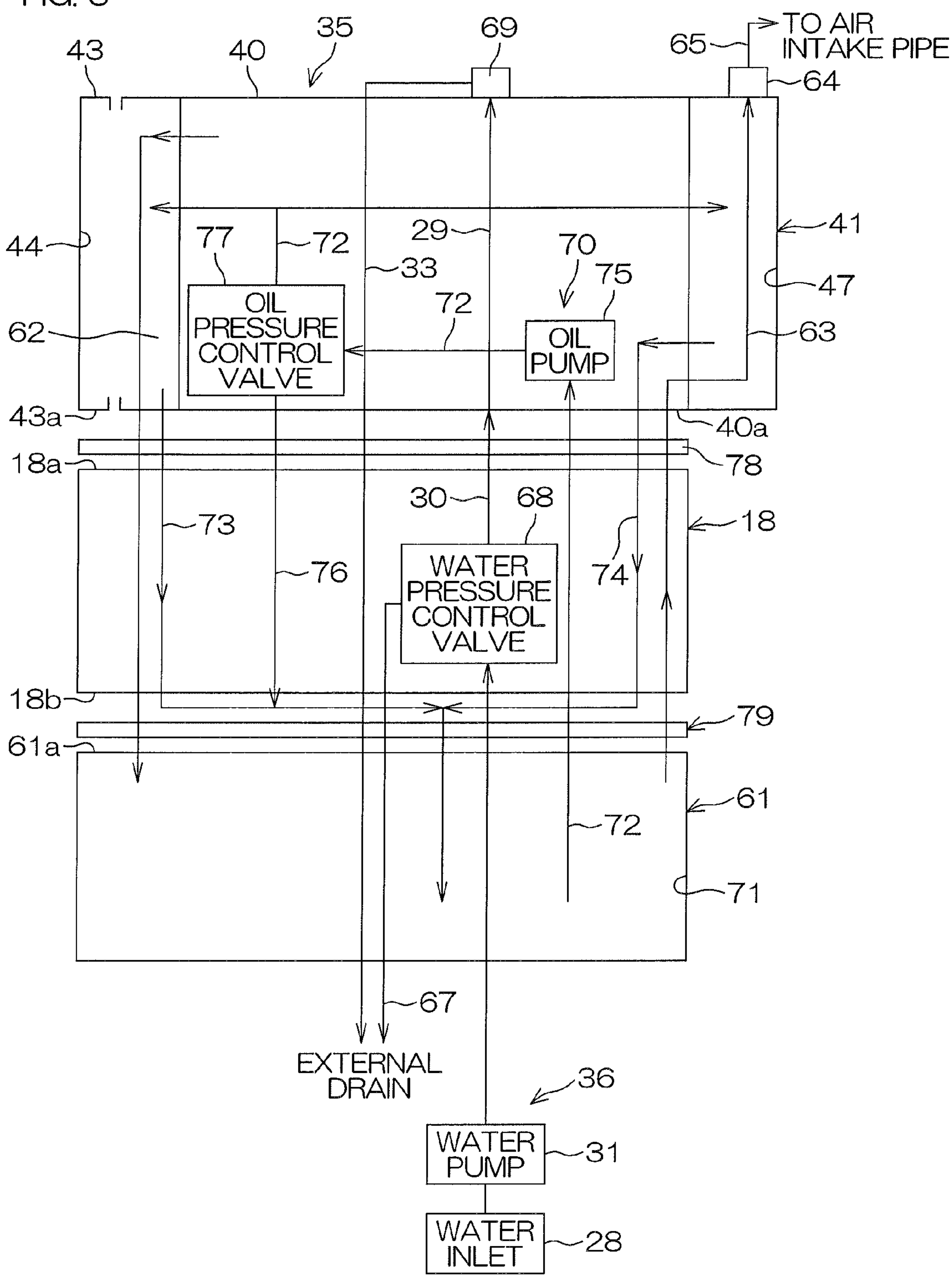
66
60
47
64
52
42
45
46
51
56
53
49
57
41
55
50
37
54
58
59
23
9
48
63
RIGHT
LEFT
34
61
62
35
OIL PAN
40
39
38
Ac
43
44
FRONT

FIG. 3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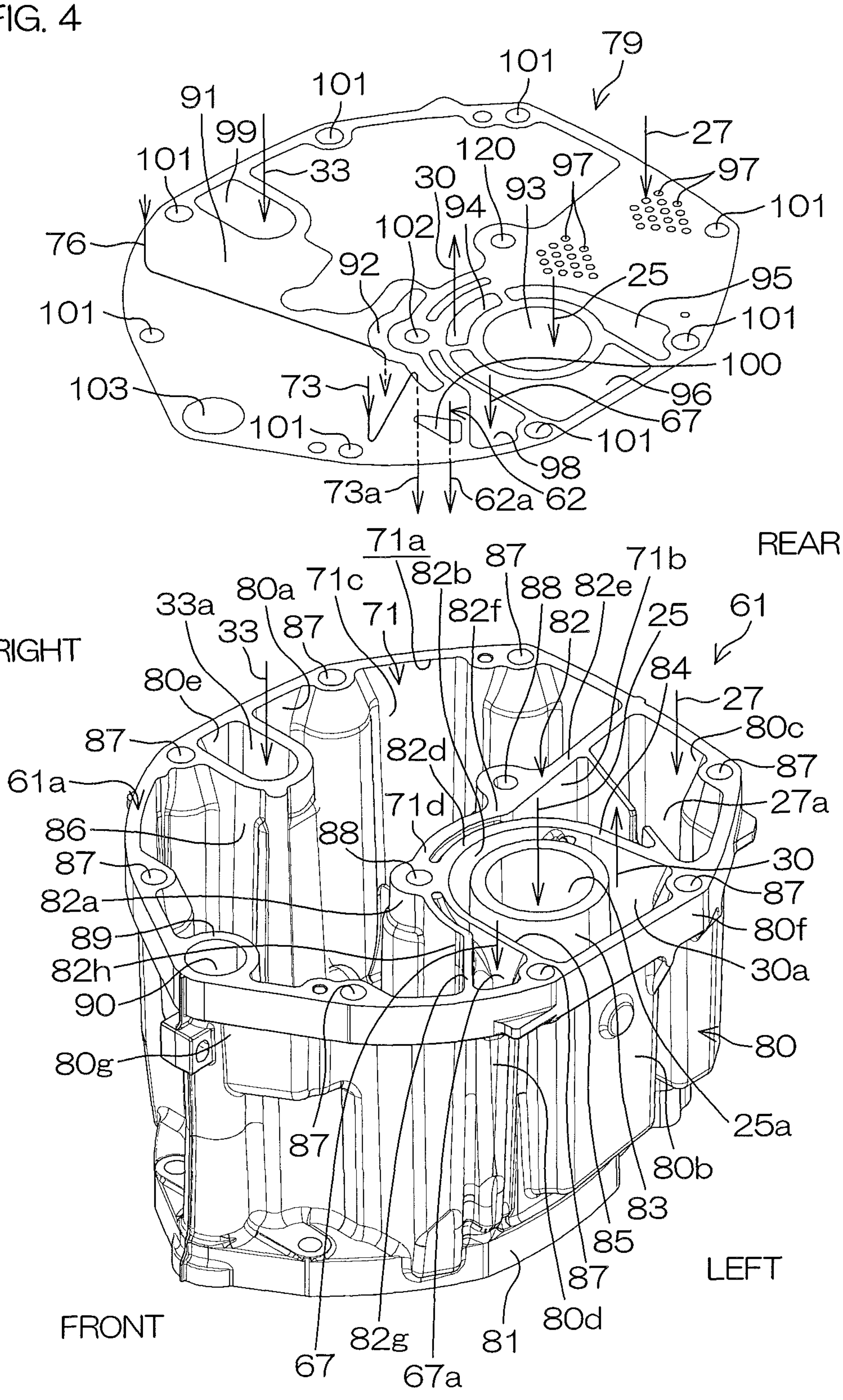
69
65
TO AIR INTAKE PIPE
43
40
64
41
44
77
72
29
33
70
75
47
OIL PRESSURE CONTROL VALVE
72
62
OIL PUMP
63
43a
40a
18a
78
30
68
18
73
WATER PRESSURE CONTROL VALVE
76
74
18b
79
61a
61
72
71
67
EXTERNAL DRAIN
36
WATER PUMP
31
WATER INLET
28

FIG. 4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33
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93
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102
76
25
92
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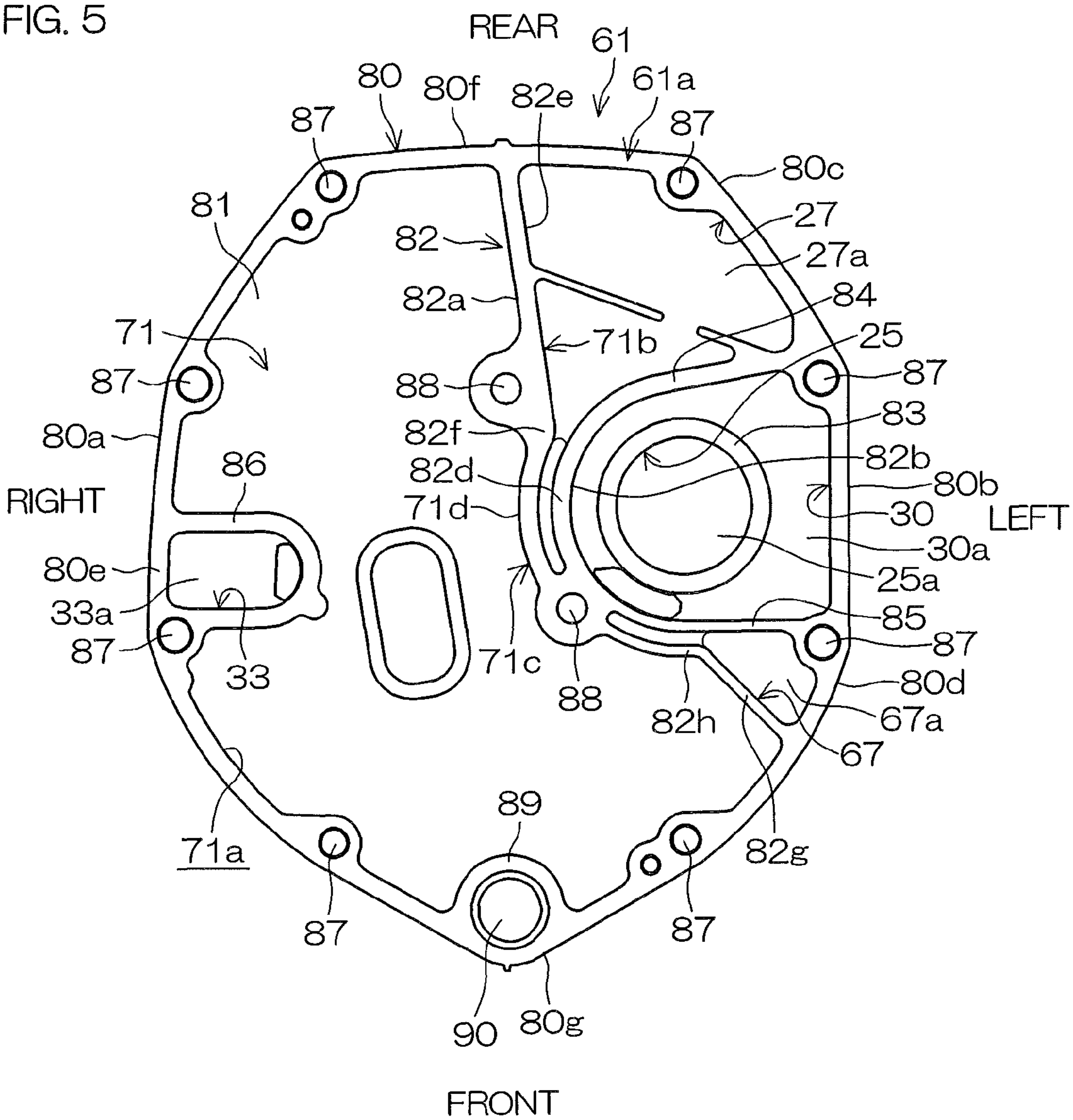
101
101
100
103
73
96
67
101
101
98
73a
62a
62
71a
REAR
87
82b
71b
80a
88
82e
71c
33a
82f
25
71
61
33
87
82
RIGHT
84
80e
27
80c
87
87
82d
61a
27a
71d
86
88
30
87
87
82a
80f
89
82h
30a
90
80
80g
25a
87
80b
83
85
LEFT
87
80d
FRONT
81
82g
67
67a

FIG. 5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80f
82e
87
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80c
81
27
27a
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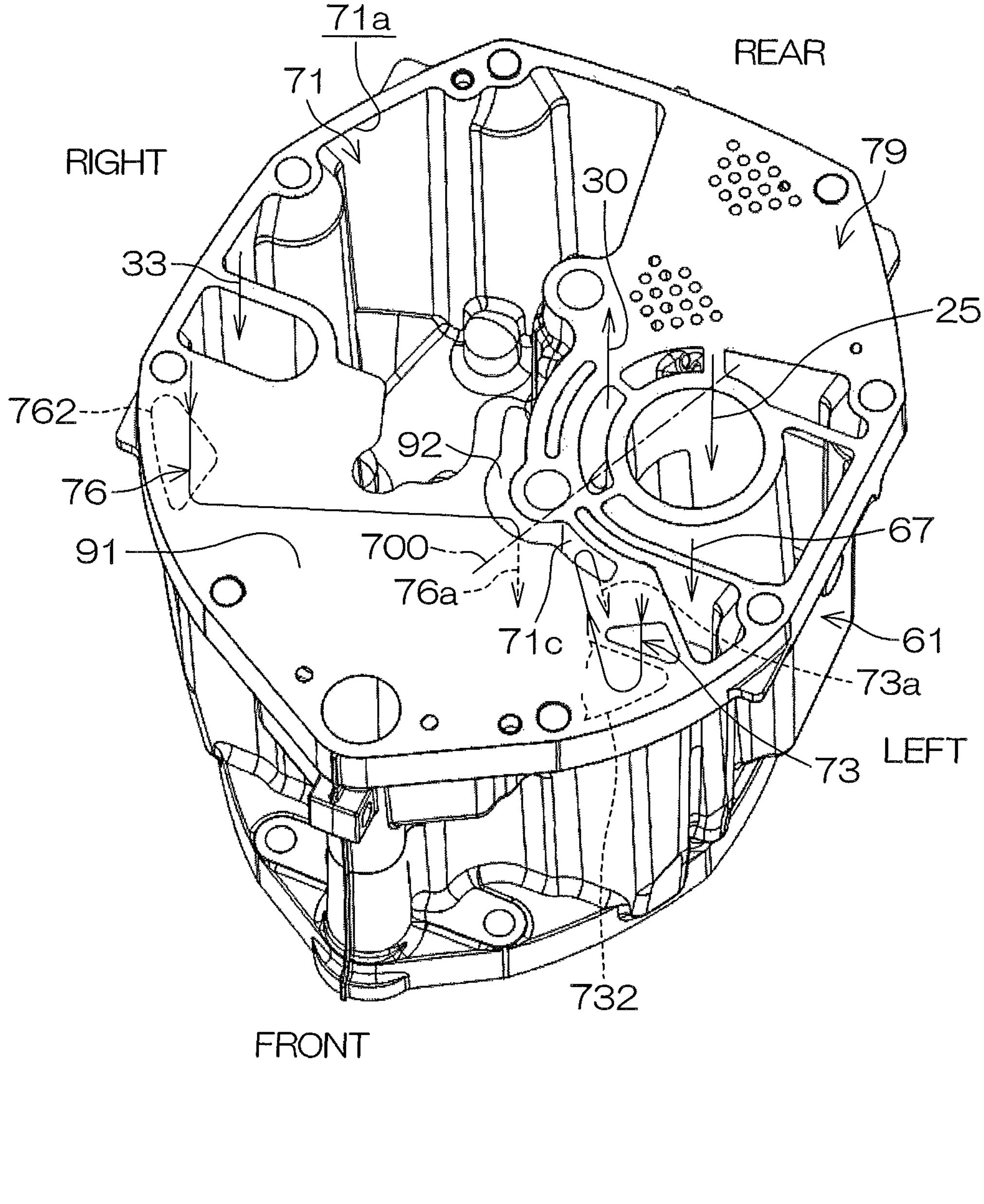
82a
84
71
71b
25
87
88
87
80a
82f
83
82b
82d
80b
RIGHT
86
71d
30
LEFT
30a
80e
25a
33a
85
87
87
33
71c
88
80d
82h
67a
67
89
71a
82g
87
87
90
80g
FRONT

FIG. 6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71
REAR
RIGHT
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79
33
25
762
92
76
67
91
700
76a
61
71c
73a
73
LEFT
732
FRONT

FIG. 7

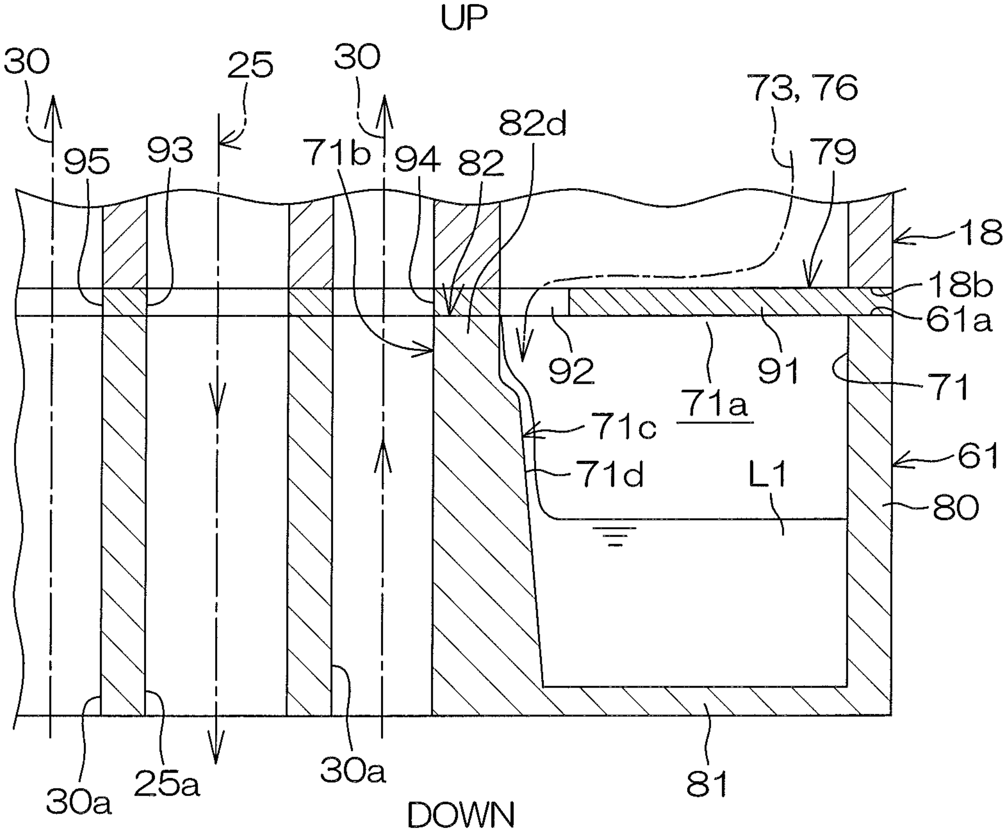

UP
30
25
30
73, 76
95
93
71b
94
82
82d
79
18
18b
61a
92
71a
91
71
71c
61
71d
L1
80
30a
25a
30a
81
DOWN

FIG. 8

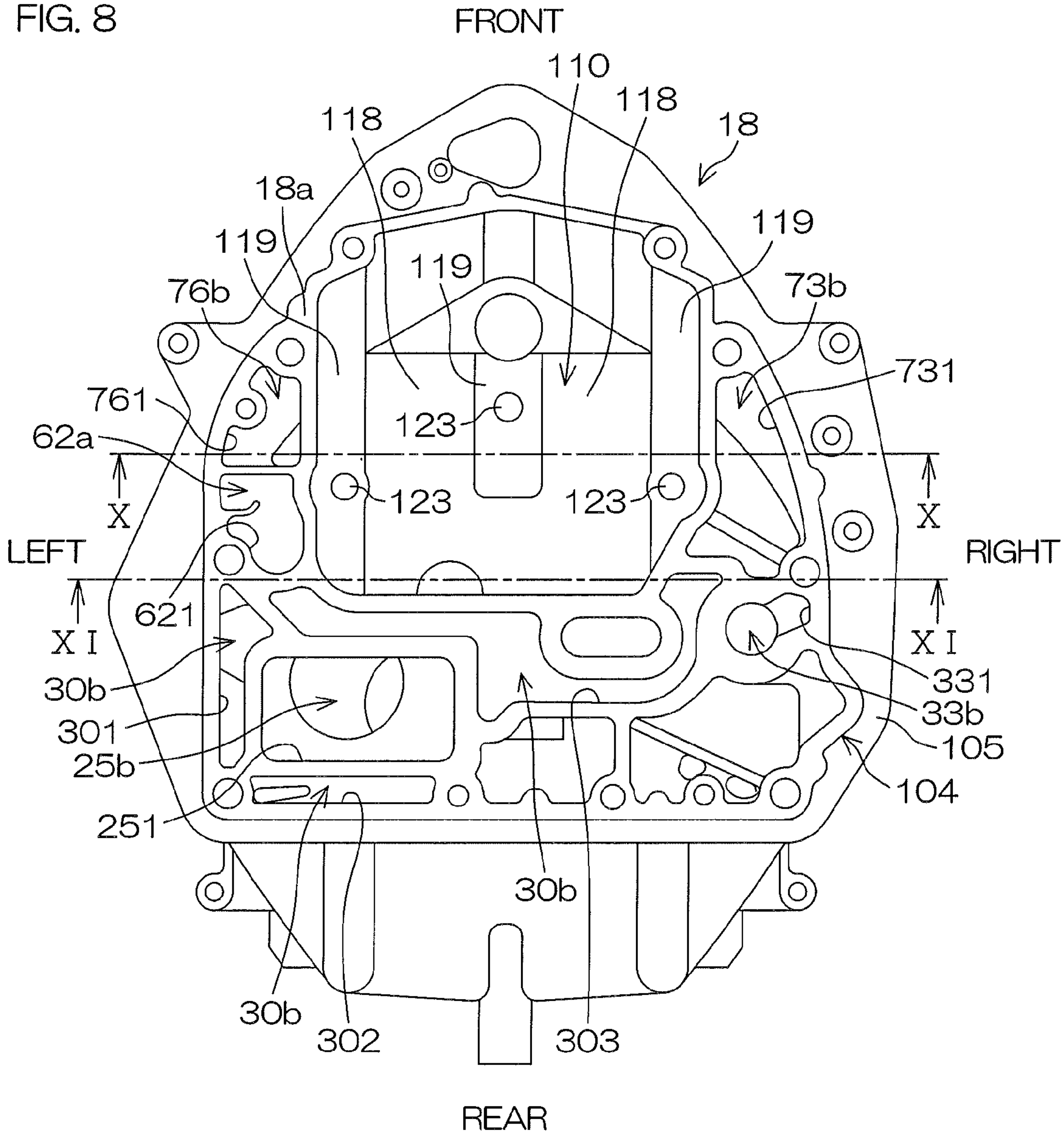

FRONT
110
118
118
18
18a
119
119
119
76b
73b
731
761
62a
123
123
123
X
X
LEFT
RIGHT
621
X I
X I
30b
331
33b
301
105
25b
104
251
30b
30b
302
303
REAR

FIG. 9

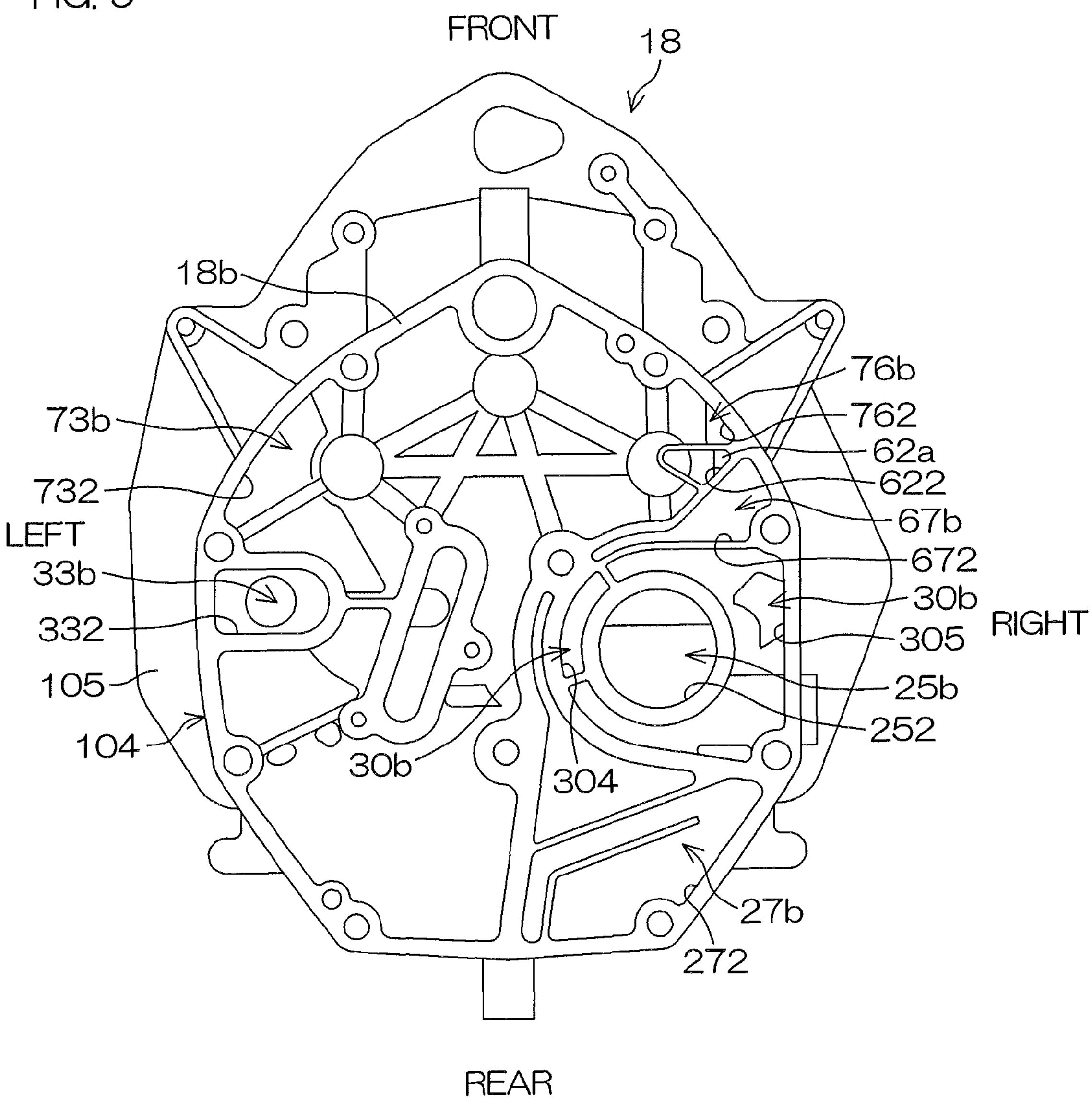

FRONT
18
18b
76b
762
62a
622
67b
672
30b
305
RIGHT
25b
252
73b
732
LEFT
33b
332
105
104
30b
304
27b
272
REAR

FIG. 10

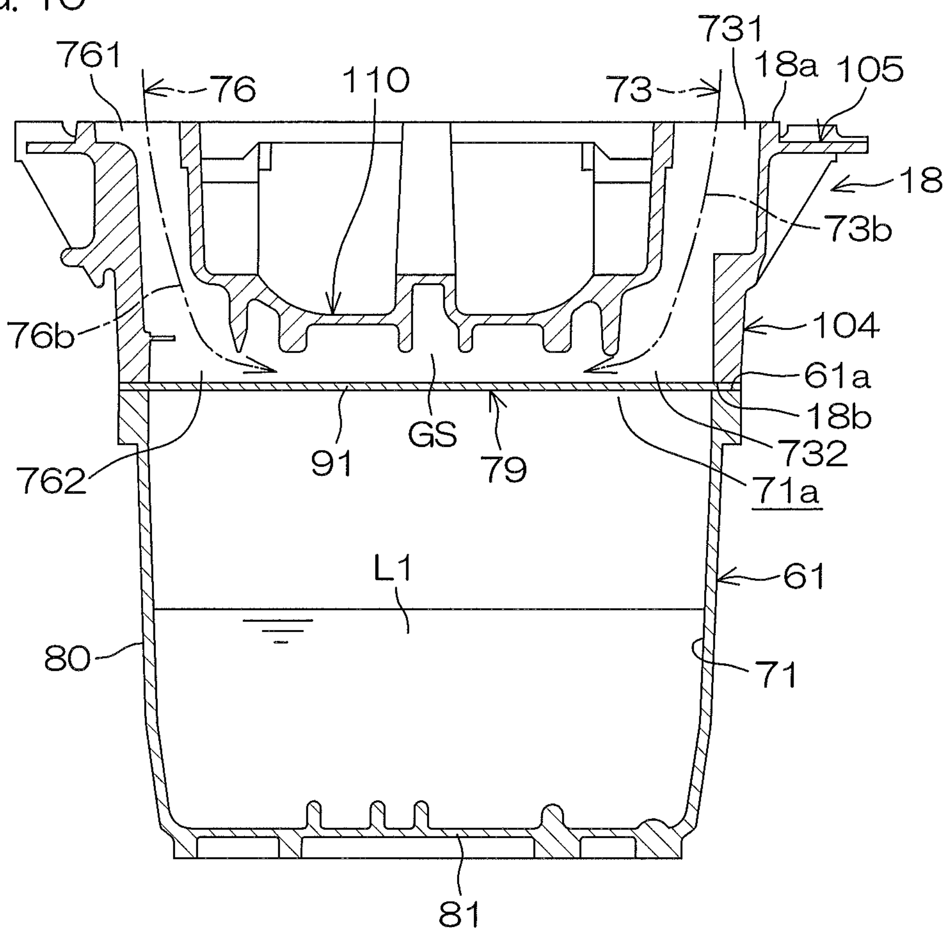
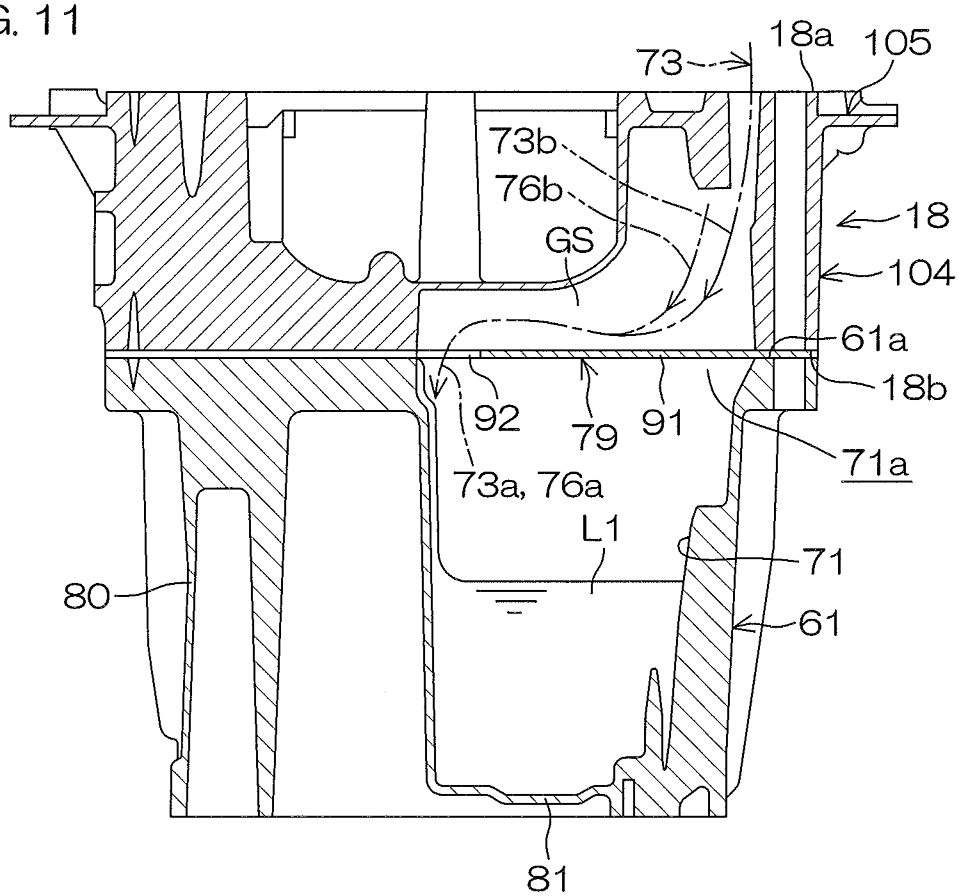

761
76
110
73
731
18a
105
18
73b
76b
104
61a
18b
732
762
91
GS
79
71a
L1
61
80
71
81

FIG. 11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18a
105
73b
76b
GS
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104
61a
18b
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79
91
71a
73a, 76a
L1
71
80
61
81

FIG. 12

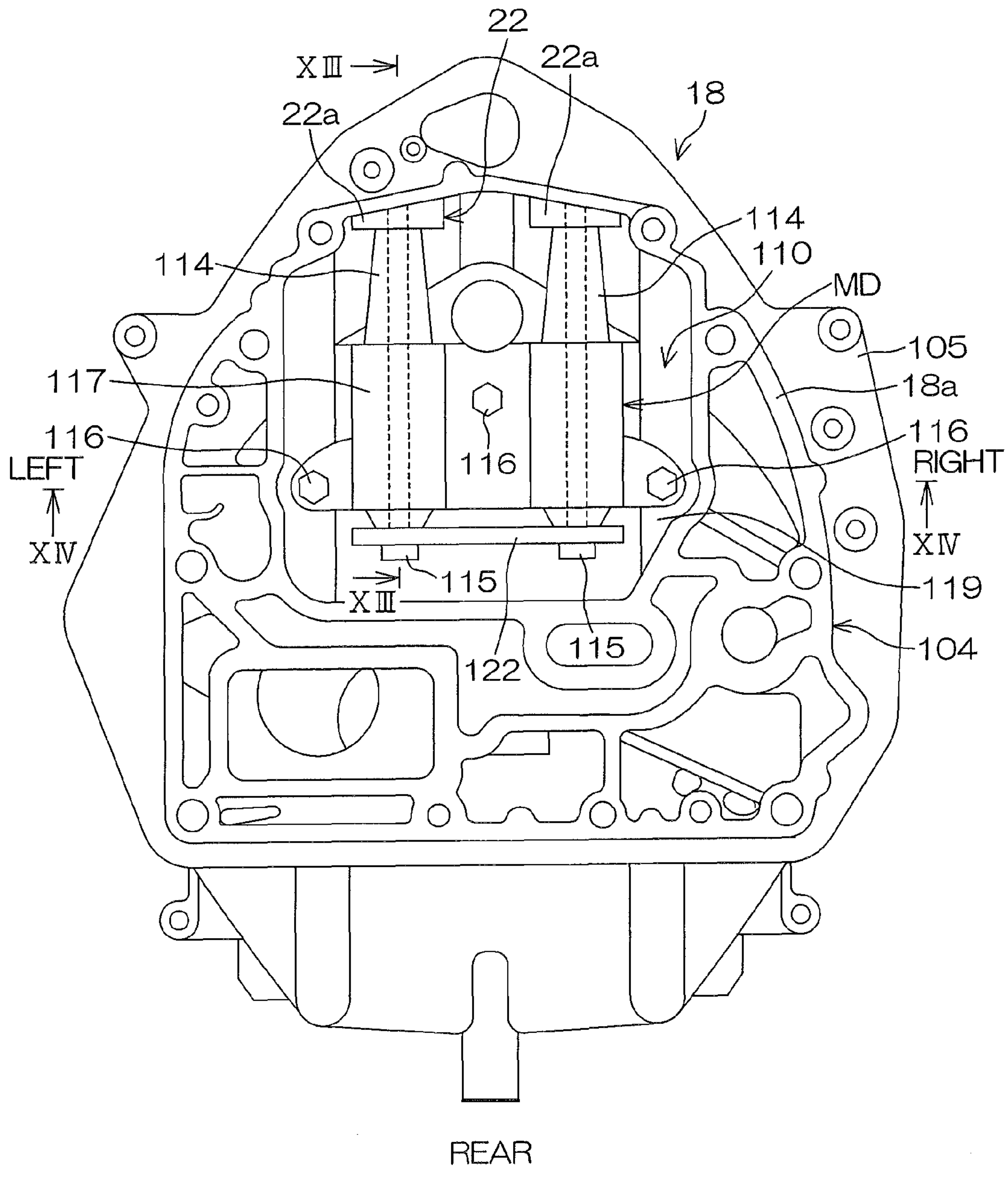
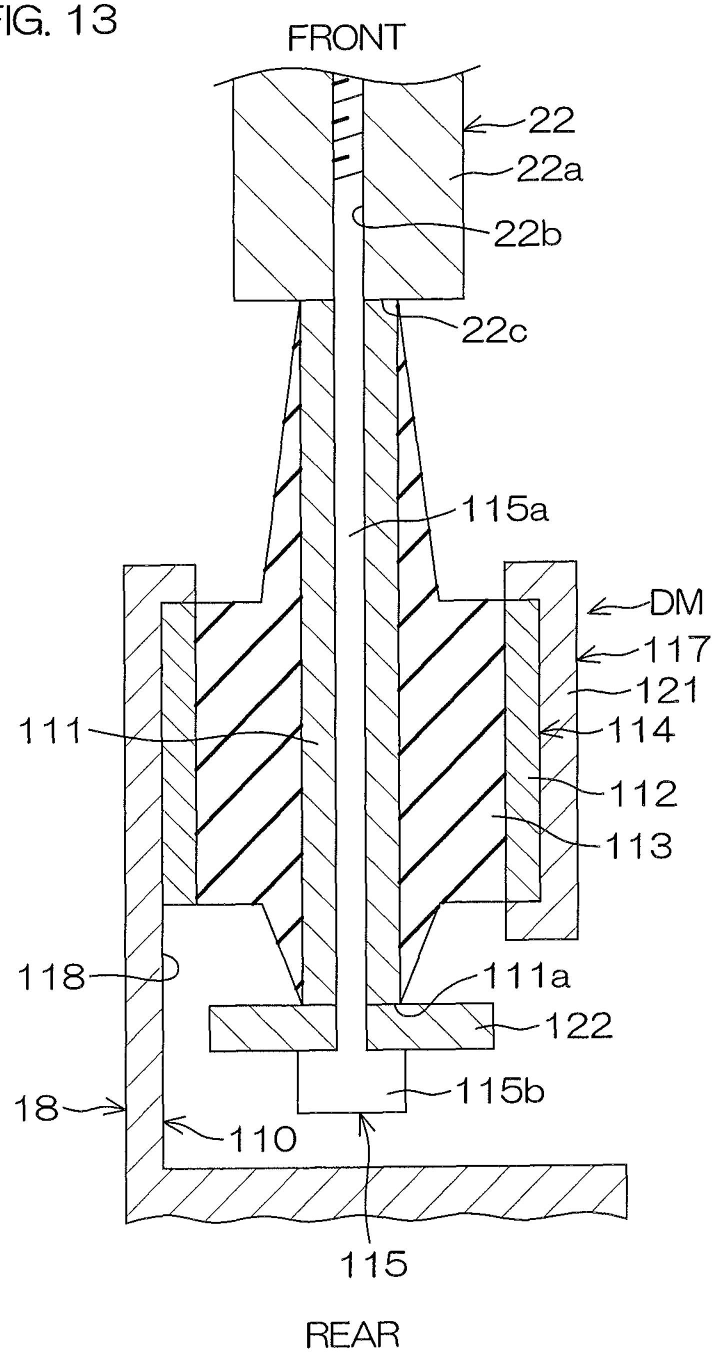

FRONT
22
22a
XIII
18
22a
114
114
110
MD
117
105
18a
116
116
116
LEFT
RIGHT
XIV
XIV
115
119
XIII
115
104
122
REAR

FIG. 13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22b
22c
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DM
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111
114
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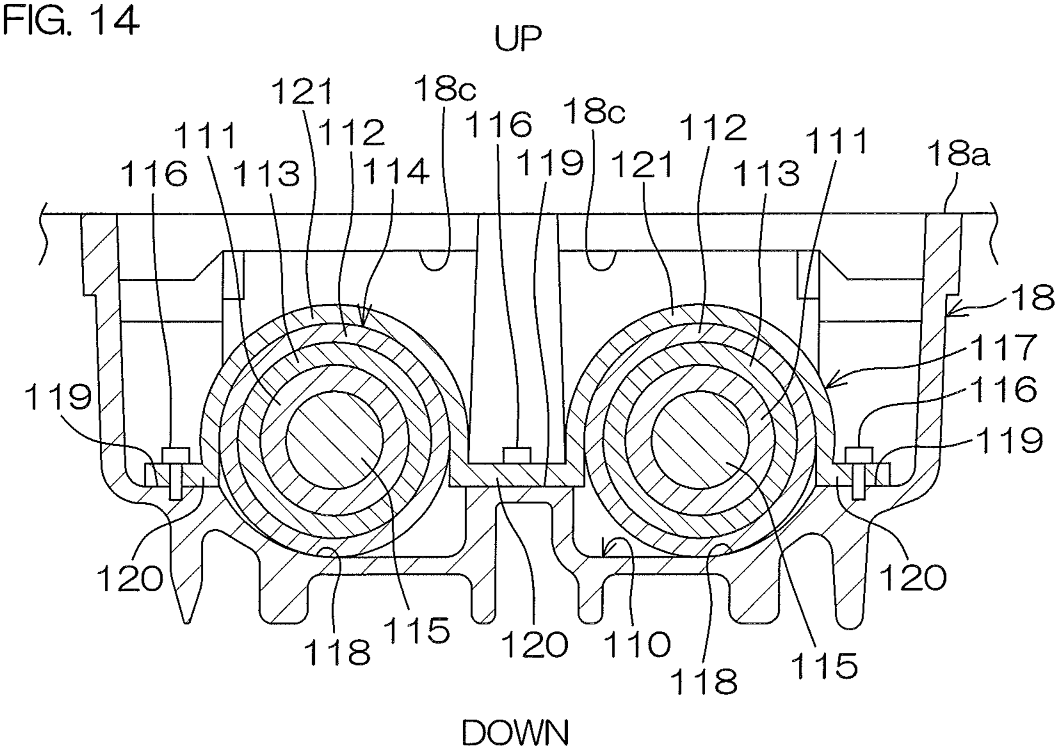
122
115b
18
110
115
REAR

FIG. 14


UP
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112
116
18c
112
111
116
113
114
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121
113
18a
18
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119
116
119
120
120
118
115
120
110
118
115
DOWN

FIG. 15

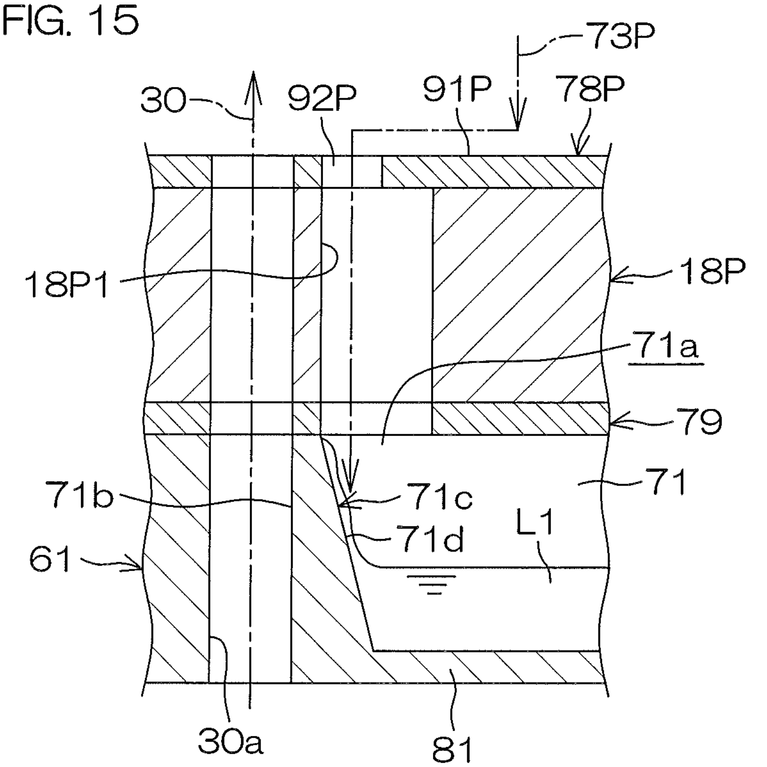
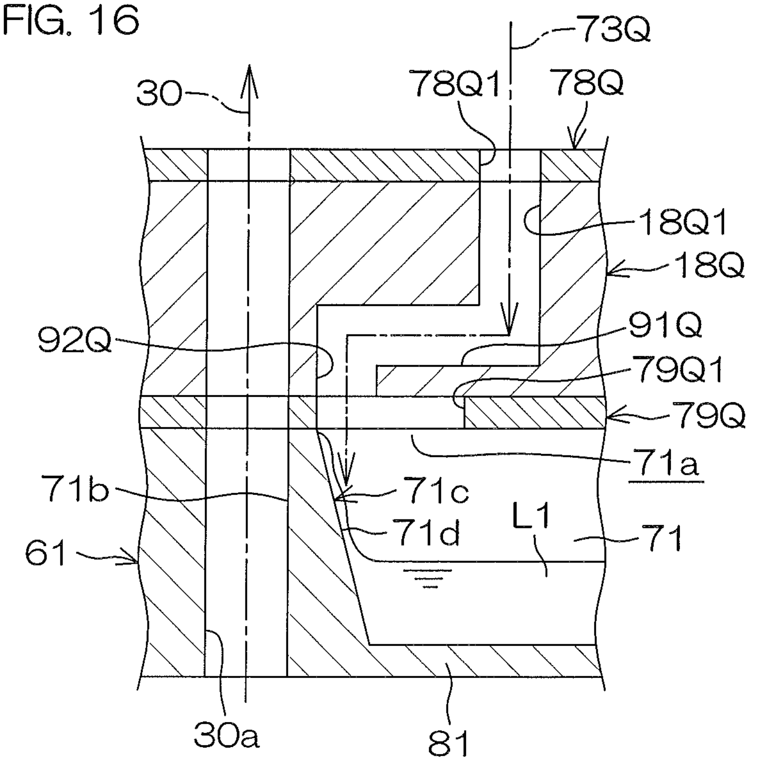

73P
30
92P
91P
78P
18P1
18P
71a
79
71b
71c
71
71d
L1
61
30a
81

FIG. 16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78Q
18Q1
18Q
91Q
92Q
79Q1
79Q
71a
71b
71c
71d
L1
61
71
30a
81

OUTBOARD MOTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an outboard motor.

2. Description of the Related Art

An outboard motor according to a related art has been described in, for example, Japanese Patent Application Publication No. 2003-002295. The outboard motor includes an oil pan that retains lubricating oil to lubricate an engine and a water retaining portion disposed around the oil pan.

An outboard motor according to another related art has been described in, for example, Japanese Patent Application Publication No. 2006-168701. In the outboard motor, a cooling water jacket is disposed at a bottom portion of an oil pan. A space is provided between at least a portion of an outer wall surface of the oil pan and a cooling water passage.

SUMMARY OF THE INVENTION

The inventor of preferred embodiments of the present invention described and claimed in the present application conducted an extensive study and research regarding an outboard motor, such as the one described above, and in doing so, discovered and first recognized new unique challenges and previously unrecognized possibilities for improvements as described in greater detail below.

Lubricating oil for engine lubrication needs to be sufficiently cooled in an oil pan. If the cooling of lubricating oil in the oil pan is insufficient, a separate component such as an oil cooler needs to be provided.

In the outboard motor described in Japanese Patent Application Publication No. 2003-002295, because the water retaining portion is disposed around the oil pan, it is considered that an inner wall surface of the oil pan is maintained at low temperature, and lubricating oil inside the oil pan is efficiently cooled. However, when the liquid level of the lubricating oil is lower than the liquid level of cooling water, a portion that is not in contact with the lubricating oil (a portion that is in contact with air) in the inner wall surface of the oil pan is maintained at low temperature. Therefore, condensation may occur at the inner wall surface of the oil pan to degrade performance of the lubricating oil due to dilution or the like.

In the outboard motor described in Japanese Patent Application Publication No. 2006-168701, a space is provided between at least a portion of the outer wall surface of the oil pan and the cooling water passage to avoid the inner wall surface of the oil pan from being maintained at a lower temperature at a position higher than the bottom portion of the oil pan in order to prevent the occurrence of condensation. However, with this arrangement, the area of a portion that is efficiently cooled by cooling water in the inner wall surface of the oil pan decreases, so that the lubricating oil cannot be efficiently cooled inside the oil pan.

If the area of the outer wall surface of the oil retaining portion contacting cooling water is increased, the cooling performance of the lubricating oil in the oil pan can be enhanced. However, if the area to contact cooling water is large, there is a high possibility that condensation occurs. If the area to contact cooling water is reduced in order to prevent the occurrence of condensation, the cooling performance of the lubricating oil in the oil pan degrades. Thus, with the outboard motors of the related art described above, preventing the occurrence of condensation in the oil pan while enhancing the cooling performance of the lubricating oil in the oil pan cannot be achieved.

In order to overcome the previously unrecognized and unsolved challenges described above, a preferred embodiment of the present invention provides an outboard motor including an engine including a crankshaft that is rotatable about a rotation axis extending in an up-down direction, and a crank chamber that houses the crankshaft, an oil pan that includes an oil retaining portion provided at an upper end portion thereof with an opening opened upward, and that is disposed under the engine and configured to retain lubricating oil to be supplied to at least the crank chamber inside the oil retaining portion, a cooling water passage disposed along an outer wall surface of the oil retaining portion, an oil recovery passage that extends downward from the crank chamber to the oil retaining portion and configured to lead lubricating oil inside the crank chamber to the inside of the oil retaining portion, and a guide member that is provided with a shielding portion disposed inside the oil recovery passage so as to be located over the opening of the oil retaining portion and a guide hole disposed inside the oil recovery passage so as to be located over an inner wall surface of the oil retaining portion and that is configured to guide lubricating oil inside the oil recovery passage to the guide hole by the shielding portion and to allow lubricating oil to flow down to the inner wall surface of the oil retaining portion from the guide hole.

According to this arrangement, because cooling water contacts the outer wall surface of the oil retaining portion, the inner wall surface of the oil retaining portion is efficiently cooled, and maintained at low temperature. Lubricating oil is thus efficiently cooled.

Lubricating oil that flows down toward the opening of the oil retaining portion is blocked by the shielding portion, and guided to the guide hole. Because the guide hole is located over the inner wall surface of the oil retaining portion, the lubricating oil that has flowed down from the guide hole flows down along the inner wall surface of the oil retaining portion. The lubricating oil is thus efficiently cooled by the inner wall surface that has a low temperature. Further, because the area of a portion exposed from the lubricating oil in the inner wall surface of the oil retaining portion decreases, the amount of water to be generated by condensation is significantly reduced.

The inner wall surface of the oil retaining portion preferably includes an adjacent portion located on the periphery of the cooling water passage, and the guide hole preferably is disposed over the adjacent portion.

According to this arrangement, because lubricating oil that has flowed down from the guide hole thus flows down along the efficiently cooled adjacent portion, the lubricating oil is more efficiently cooled.

The adjacent portion of the oil retaining portion preferably is covered with lubricating oil that has passed through the guide hole.

According to this arrangement, the lubricating oil is more efficiently cooled. Because the area of a portion exposed from the lubricating oil in the inner wall surface of the oil retaining portion further decreases, the amount of water to be generated by condensation is significantly reduced.

The cooling water passage preferably includes a cooling water supply passage extending to the engine from a water inlet to be disposed in water and disposed along the outer wall surface of the oil retaining portion.

According to this arrangement, because low-temperature cooling water before being used for cooling the engine flows along the outer wall surface of the oil retaining portion, the lubricating oil is more efficiently cooled.

The outboard motor preferably further includes an exhaust passage extending downward from the engine through the oil pan, and at least a portion of the cooling water passage preferably is disposed between the oil retaining portion and the exhaust passage.

According to this arrangement, low-temperature cooling water before being used for cooling the engine is used to cool both the lubricating oil in the oil retaining portion and exhaust in the exhaust passage.

The guide member preferably includes an oil pan gasket that is provided with the shielding portion and the guide hole, and contacts the oil pan between the engine and the oil pan.

According to this arrangement, a simple design modification of the oil pan gasket easily realizes a function as a guide member that guides lubricating oil inside the oil recovery passage.

The outboard motor preferably further includes a blowby gas passage that is separated from the oil recovery passage and extends downward from the crank chamber to the oil retaining portion, and is configured to lead a blowby gas inside the crank chamber to the inside of the oil retaining portion.

According to this arrangement, disruption of the flow of lubricating oil inside the oil recovery passage by a blowby gas the flow direction of which inside the crank chamber is not fixed in one direction due to the effect of the motion of the piston of the engine is significantly reduced or prevented.

The outboard motor preferably further includes an exhaust passage extending downward from the engine through the oil pan, and an exhaust guide provided with a portion of the oil recovery passage, the blowby gas passage, and the exhaust passage, disposed between the engine and the oil pan.

The exhaust guide preferably further includes amount support portion on which a mount damper to be interposed between a hull and the outboard motor is disposed.

The guide member preferably includes an engine gasket disposed between the engine and oil pan, an exhaust guide disposed between the engine gasket and the oil pan, and an oil pan gasket disposed between the exhaust guide and the oil pan, and the shielding portion and the guide hole are provided in any of the engine gasket, the exhaust guide, and the oil pan gasket.

According to this arrangement, the degree of freedom of design increases.

The above and other elements, features, steps, characteristics and advantages of the present invention will become more apparent from the following detailed description of the preferred embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic side view of an outboard motor according to a first preferred embodiment of the present invention.

FIG. **2** is a schematic sectional view of an engine.

FIG. **3** is a block diagram schematically showing flows of cooling water, lubricating oil, and blowby gas.

FIG. **4** is an exploded perspective view of an oil pan and an oil pan gasket.

FIG. **5** is a plan view of the oil pan.

FIG. **6** is a perspective view of the oil pan fitted with the oil pan gasket.

FIG. **7** is a schematic sectional view of an exhaust guide, the oil pan gasket, and the oil pan, and shows a section cut along a vertical plane including line **700** in FIG. **6**.

FIG. **8** is a plan view of the exhaust guide.

FIG. **9** is a bottom view of the exhaust guide set on the oil pan.

FIG. **10** is a sectional view of the exhaust guide, the oil pan gasket, and the oil pan, and corresponds to a sectional view cut along line X-X in FIG. **8**.

FIG. **11** is a sectional view of the exhaust guide, the oil pan gasket, and the oil pan, and corresponds to a sectional view cut along line XI-XI in FIG. **8**.

FIG. **12** is a plan view of the exhaust guide mounted with a mount damper.

FIG. **13** is a sectional view of the principal portion of the mount damper and a mount support portion of the exhaust guide, and corresponds to a sectional view cut along line XIII-XIII in FIG. **12**.

FIG. **14** is a sectional view of the principal portion of the mount damper and a mount support portion of the exhaust guide, and corresponds to a sectional view cut along line XIV-XIV in FIG. **12**.

FIG. **15** is a schematic sectional view of the principal portion of an engine gasket, an exhaust guide, an oil pan gasket, and an oil pan in a second preferred embodiment of the present invention.

FIG. **16** is a schematic sectional view of the principal portion of an engine gasket, an exhaust guide, an oil pan gasket, and an oil pan in a third preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** is a schematic side view showing a vessel **1** according to a first preferred embodiment of the present invention. As shown in FIG. **1**, the vessel **1** includes a hull H**1** that is configured float on a water surface and a vessel propulsion device **2** that is configured to propel the hull H**1**. The vessel propulsion device **2** includes a suspension device **3** that is mountable on a rear portion (stern) of the hull H**1** and an outboard motor **4** coupled to the suspension device **3**.

The suspension device **3** includes a pair of left and right clamp brackets **5** to be mounted on the hull H**1**, a tilting shaft **6** supported in a posture of extending in the left-right direction by the pair of clamp brackets **5**, and a swivel bracket **7** mounted on the tilting shaft **6**. The suspension device **3** further includes a steering shaft **8** supported in a posture of extending in the up-down direction by the swivel bracket **7**.

The outboard motor **4** is mounted on the steering shaft **8**. The steering shaft **8** is supported by the swivel bracket **7** so as to be rotatable about a steering axis (center line of the steering shaft **8**) extending in the up-down direction. The swivel bracket **7** is supported by the clamp brackets **5** via the tilting shaft **6**. The swivel bracket **7** is turnable about a tilt axis (center line of the tilting shaft **6**) extending in the left-right direction, with respect to the clamp brackets **5**. The outboard motor **4** is turnable to the left and right with respect to the suspension device **3**, and is turnable up and down with respect to the suspension device **3**. Thus, the outboard motor **4** is turnable to the left and right with respect to the hull H**1**, and is turnable up and down with respect to the hull H**1**.

Also, the vessel **1** preferably includes a steering bracket **22** to be mounted on the steering shaft **8** in an integrally rotatable manner, and a mount damper MD configured to function as a mount that couples the steering bracket **22** and an exhaust guide **18** to be described later of the outboard motor **4**. The mount damper MD is interposed between the hull H**1** and the outboard motor **4**, and is configured to significantly reduce or prevent vibration of the outboard motor **4** from being transmitted to the hull H**1**.

The outboard motor **4** includes an engine **9** configured to generate power to rotate a propeller **13** and propel the hull **1** and a power transmission system configured to transmit the power of the engine **9** to the propeller **13**. The power transmission system includes a drive shaft **10** coupled to the engine **9**, a forward/reverse switching mechanism **11** coupled to the drive shaft **10**, and a propeller shaft **12** coupled to the forward/reverse switching mechanism **11**. The outboard motor **4** further includes an engine cover **14** that covers the engine **9** and a casing **17** that houses the power transmission system.

The engine cover **14** houses the engine **9**. The engine cover **14** includes a cup-shaped bottom cover **15** opened upward, and a cup-shaped top cover **16** opened downward. The top cover **16** is removably mounted on the bottom cover **15**. The opening portion of the top cover **16** is laid on the opening portion of the bottom cover **15** via a seal (not shown) one on the top of the other. The bottom cover **15** is mounted on the casing **17** (specifically, an exhaust guide **18** to be described later).

The casing **17** includes an exhaust guide **18** disposed under the engine **9**, an upper case **19** disposed under the exhaust guide **18**, and a lower case **20** disposed under the upper case **19**. The engine **9** is mounted on the exhaust guide **18**. The engine **9** is disposed higher than the steering shaft **8**. The exhaust guide **18** defining and serving as an engine support member supports the engine **9** with a rotation axis of the engine **9** (corresponding to a rotation axis Ac of a crankshaft **38**) being in a vertical posture.

The engine **9** is disposed over the drive shaft **10**. The drive shaft **10** extends in the up-down direction inside the casing **17**. A center line of the drive shaft **10** preferably is disposed on the rotation axis of the engine **9**, and preferably is deviated with the rotation axis of the engine **9**. An upper end portion of the drive shaft **10** is coupled to the engine **9**. A lower end portion of the drive shaft **10** is coupled to a front end portion of the propeller shaft **12** via the forward/reverse switching mechanism **11**. The propeller shaft **12** extends in the front-rear direction inside the casing **17**. A rear end portion of the propeller shaft **12** projects rearward from the casing **17**. The propeller **13** is removably mounted on the rear end portion of the propeller shaft **12**. The propeller **13** includes an outer cylinder **13***a* surrounding the propeller shaft **12** about a propeller axis (center line of the propeller shaft **12**), and a plurality of blades **13***b* extending outward from the outer cylinder **13***a*. The outer cylinder **13***a* and the blades **13***b* rotate about the propeller axis together with the propeller shaft **12**.

The engine **9** preferably is an internal combustion engine. The engine **9** rotates in a fixed rotation direction. The rotation of the engine **9** is transmitted to the propeller **13** by the power transmission system (the drive shaft **10**, the forward/reverse switching mechanism **11**, and the propeller shaft **12**). The propeller **13** is thus caused to rotate together with the propeller shaft **12** and a thrust that propels the vessel **1** forward or in reverse is generated. Also, the direction of a rotation transmitted from the drive shaft **10** up to the propeller shaft **12** is switched by the forward/reverse switching mechanism **11**. The rotation direction of the propeller **13** and the propeller shaft **12** is thus switched between a normal rotation direction (clockwise direction when the propeller **13** is viewed from the rear) and a reverse rotation direction (direction of rotation opposite to the normal rotation direction). The direction of thrust is thus switched.

The outboard motor **4** includes an exhaust passage **23** that discharges exhaust generated by the engine **9** to the outside of the outboard motor **4**. The exhaust passage **23** is provided in the interior of the outboard motor **4**. The exhaust passage **23** includes an exhaust port **24** opening at a rear end portion of the propeller **13** (a rear end portion of the outer cylinder **13***a*), and a main exhaust passage **25** extending from a combustion chamber **48** of the engine **9** to the exhaust port **24**. The exhaust passage **23** further includes an idle exhaust port **26** opening at an outer surface of the outboard motor **4**, and an idle exhaust passage **27** extending from the main exhaust passage **25** to the idle exhaust port **26**.

The main exhaust passage **25** extends downward from the engine **9** to the propeller shaft **12** via the exhaust guide **18**, and extends rearward along the propeller shaft **12**. The main exhaust passage **25** opens rearward at the rear end portion of the propeller **13**. The exhaust port **24** is thus disposed in water. The idle exhaust port **26** and the idle exhaust passage **27** are disposed higher than the exhaust port **24**. The idle exhaust passage **27** branches from the main exhaust passage **25**. The idle exhaust port **26** is disposed higher than a waterline WL (height of the water surface when the vessel **1** equipped with the vessel propulsion device **2** is stopped). The idle exhaust port **26** thus opens into air.

The exhaust generated in the combustion chamber **48** is discharged into the main exhaust passage **25**, and is guided toward the exhaust port **24**. When the output of the engine **9** is high, the exhaust inside the main exhaust passage **25** is mainly discharged into water from the exhaust port **24**. Also, a portion of the exhaust inside the main exhaust passage **25** is led to the idle exhaust port **26** by the idle exhaust passage **27**, and is released into the atmosphere from the idle exhaust port **26**. On the other hand, when the output of the engine **9** is low (for example, when the engine **9** is idling), the exhaust pressure inside the main exhaust passage **25** is low and the exhaust inside the main exhaust passage **25** is thus mainly released into the atmosphere from the idle exhaust port **26**.

The outboard motor **4** preferably includes a water-cooled type cooling device **36** that cools the interior of the outboard motor **4**. The cooling device **36** includes a water inlet **28** disposed under the engine **9** and opening at the outer surface of the outboard motor **4**, and a cooling water passage **29** (water jacket) provided in the engine **9**. The cooling device **36** further includes a cooling water supply passage **30** defining and serving as a cooling water passage extending from the water inlet **28** to the engine **9** to connect to the cooling water passage **29** inside the engine **9**, and a water pump **31** disposed in the cooling water supply passage **30**. The water pump **31** takes water outside the outboard motor **4** defining and serving as cooling water into the interior of the outboard motor **4** from the water inlet **28**, and supplies the taken-in water to the engine **9** via the cooling water supply passage **30**. The cooling device **36** further includes a water outlet **32** opening at an outer surface of the lower case **20**, and a cooling water drain passage **33** through which water supplied from the cooling water supply passage **30** to the engine **9** flows. The cooling water drain passage **33** extends inside the outboard motor **4** from the cooling water passage **29** to the water outlet **32**.

The water inlet **28** is disposed lower than the cooling water passage **29** and the water pump **31**. The water inlet **28** opens at the outer surface of the lower case **20**. The water inlet **28** is thus disposed in water. The water inlet **28** is connected to the cooling water passage **29** inside the engine **9** via the cooling water supply passage **30** defining and serving as a cooling water passage provided in the interior of the outboard motor **4**. The water pump **31** is disposed in the cooling water supply passage **30**. The water pump **31** is thus disposed in the interior of the outboard motor **4**. The water pump **31** is disposed lower than the engine **9**.

The water pump **31** is mounted on the drive shaft **10**. The water pump **31** is a rotary pump including an impeller **31***a* defining and serving as a rotor that rotates together with the drive shaft **10**, and a pump case **31***b* that houses the impeller **31***a*. When the engine **9** rotates the drive shaft **10**, the impeller **31***a* rotates inside the pump case **31***b* and a suction force to suck water outside the outboard motor **4** into the water inlet **28** is generated. The water pump **31** is thus driven by the engine **9**. The impeller **31***a* defining and serving as a rotor is driven to rotate by the engine **9** such that the flow rate of water increases with an increase in the rotation speed of the engine **9**.

The water outside the outboard motor **4** defining and serving as cooling water is sucked from the water inlet **28** into the cooling water supply passage **30** defining and serving as a cooling water passage, and is delivered from the cooling water supply passage **30** to the cooling water passage **29** (water jacket) inside the engine **9** via the water pump **31**. High-temperature portions of the engine **9** etc., are thus cooled by the cooling water. Then, the cooling water supplied to the engine **9** is guided by the cooling water drain passage **33** to the water outlet **32**, and is discharged from the water outlet **32**.

The engine **9** includes an engine main body **35** provided with a plurality of cylinders **34**. The engine **9** may be an in-line engine or a V-type engine, or may be an engine of a type other than these, for example. Also, the engine **9** is not limited to being a multi-cylinder engine and may instead be a single-cylinder engine, for example. The engine main body **35** includes a plurality of pistons **37** respectively disposed inside the plurality of cylinders **34**, a crankshaft **38** that is rotatable about the rotation axis Ac extending in the up-down direction, and a plurality of connecting rods **39** that couple each of the plurality of pistons **37** to the crankshaft **38**.

FIG. **2** is a schematic view showing a schematic configuration of the engine **9** in FIG. **1**. As shown in FIG. **2**, the engine main body **35** further includes a cylinder body **40** that houses the plurality of pistons **27**, a cylinder head **41** that defines the plurality of cylinders **34** together with the cylinder body **40**, a head cover **42** that covers the cylinder head **41**, and a crank case **43** that houses the crankshaft **38** together with the cylinder body **40**.

The crank case **43**, the cylinder body **40**, the cylinder head **41**, and the head cover **42** are aligned in the front-rear direction in this order from the front. The cylinder head **41** and the crack case **43** are mounted on the cylinder body **40**, and are disposed on mutually opposite sides with respect to the cylinder body **40**. The head cover **42** is mounted on the cylinder head **41**. The crank case **43** and the cylinder body **40** define a crank chamber **44** to house the crankshaft **38** between the crank case **43** and the cylinder body **40**. The cylinder head **41** and the head cover **42** define a cam chamber **47** to house an intake camshaft **45** and an exhaust cam shaft **46** between the cylinder head **41** and the head cover **42**.

The engine main body **35** includes pluralities of combustion chambers **48**, intake ports **49**, and exhaust ports **50** provided in the cylinder head **41**. Each intake port **49** and each exhaust port **50** opens at an outer surface of the cylinder head **41**, and extends from the outer surface of the cylinder head **41** up to the inner surface of a corresponding combustion chamber **48**.

The engine **9** includes an intake device **51** configured to supply air to the plurality of combustion chambers **48**, a fuel supply device **52** that supplies fuel to the plurality of combustion chambers **48**, and an exhaust device **53** that discharges exhaust generated in the plurality of combustion chambers **48** via the plurality of exhaust ports **50**. The intake device **51**, the fuel supply device **52**, and the exhaust device **53** are mounted on the engine main body **35**.

The intake device **51** includes an intake pipe **54** configured to supply air to the plurality of combustion chambers **48** via the plurality of intake ports **49**. The intake pipe **54** is mounted to the cylinder head **41**, and the interior of the intake pipe **54** is connected to each intake port **49**. The intake ports **49** and the intake pipe **54** define a portion of an intake passage **55** that guides air to the combustion chambers **48**.

The fuel supply device **52** includes a plurality of fuel injectors **56** configured to supply fuel to the plurality of combustion chambers **48**. An outlet of the fuel injector **56** that injects fuel is disposed in the intake port **49**.

The exhaust device **53** includes an exhaust pipe **57** configured to guide exhaust discharged from the plurality of combustion chambers **48** via the plurality of exhaust ports **50**. The exhaust pipe **57** is mounted to the cylinder head **41**. The cylinder body **40**, the cylinder head **41**, and the exhaust pipe **57** define a portion of the exhaust passage **23**.

The engine **9** includes a plurality of intake valves **58** configured to open and close the plurality of intake ports **49**, a plurality of exhaust valves **59** configured to open and close the plurality of exhaust ports **50**, and a valve device **60** configured to move the plurality of intake valves **58** and the plurality of exhaust valves **59** to open and close corresponding intake ports **49** and corresponding exhaust ports **50**. The valve device **60** includes the intake cam shaft **45**, the exhaust cam shaft **46**, and a cam drive device (not shown) that transmits a rotation of the crankshaft **38** to the intake cam shaft **45** and the exhaust cam shaft **46**.

The outboard motor **4** includes an oil pan **61** configured to retain lubricating oil to be supplied to the engine **9**. In FIG. **2**, the oil pan **61** is schematically shown. In actuality, the oil pan **61** is disposed under the engine **9**. More specifically, the oil pan **61** is disposed under the cylinder body **40** and the crank case **43** (deep side of the sheet in FIG. **2**). The outboard motor **4** includes a first blowby gas passage **62** configured to lead a blowby gas having flowed in the interior of the crank chamber **44** (a gas that has leaked out of the combustion chamber **48** through a gap between the cylinder **34** and the piston **37**) to the oil pan **61**, and a second blowby gas passage **63** configured to lead a blowby gas from the oil pan **61** to the cam chamber **47**.

The outboard motor **4** further includes a gas-liquid separator (oil separator) **64** that separates a liquid component from a blowby gas flowed in the cam chamber **47**, and a third blowby gas passage **65** configured to lead a blowby gas from the gas-liquid separator **64** to the intake device **51**. The gas-liquid separator **64** is defined by a portion of the head cover **42**. The interior of the gas-liquid separator **64** is connected to the interior of the cam chamber **47** so that a fluid can move in and out of the interior of the gas-liquid separator **64** and the interior of the cam chamber **47**. The third blowby gas passage **65** extends from the head cover **42** to the intake pipe **54**. A portion of the third blowby gas passage **65** is defined by a blowby hose **66**.

FIG. **3** is a block diagram schematically showing an example of flows of cooling water, lubricating oil, and a blowby gas. As shown in FIG. **3**, the first blowby gas passage **62** extends downward from the crank chamber **44** to an oil retaining portion **71**. That is, the first blowby gas passage **62** extends from the cylinder body **40** to the oil pan **61** by way of the exhaust guide **18**. The second blowby gas passage **63** extends from the oil pan **61** to the cylinder head **41** by way of the exhaust guide **18** and the cylinder body **40**.

As shown in FIG. **3**, the cooling device **36** includes a cooling water relief passage **67** branching from the cooling water supply passage **30** at a branch position between the engine **9** and the water pump **31**, and a water pressure control valve **68** defining and serving as a pressure control valve disposed at the branch position. The water pressure control valve **68** (pressure control valve) is configured to drain a portion of the water inside the cooling water supply passage **30** to the exterior via the cooling water relief passage **67** when the water pressure inside the cooling water supply passage **30** is a set pressure or more to maintain the water pressure inside the cooling water supply passage **30** to be less than the set pressure.

The cooling device **36** further includes a thermostat **69** configured to open and close the cooling water passage **29** according to the temperature of the cooling water inside the cooling water passage **29**. The thermostat **69** is disposed on, for example, the cylinder body **40**. When the cooling water passage **29** is opened by the thermostat **69**, the water inside the cooling water passage **29** is discharged to the exterior via the cooling water discharge passage **33** that extends from the engine **9** to the oil pan **61** downstream of the thermostat **69**. A portion of the cooling water discharge passage **33** is defined in the exhaust guide **18** and the oil pan **61**.

As shown in FIG. **3**, the outboard motor **4** includes a lubricating device **70**. The lubricating device **70** includes the oil pan **61** including an oil retaining portion **71** configured to retain lubricating oil to be supplied to at least the crank chamber **44**, and disposed under the engine **9**. The lubricating device **70** further includes an oil supply passage **72** configured to lead lubricating oil in the oil retaining portion **71** to at least the crank chamber **44** of the engine **9**. In the present first preferred embodiment, description will be given in line with the example in which lubricating oil is led to the crank chamber **44** and the cam chamber **47** shown in FIG. **3**.

The lubricating device **70** further includes a first oil recovery passage **73** that extends downward from the crank chamber **44** to the oil retaining portion **71** and is configured to lead lubricating oil inside the crank chamber **44** to the oil retaining portion **71** of the oil pan **61**. The lubricating device **70** further includes a second oil recovery passage **74** that is configured to return lubricating oil used for lubrication inside the cam chamber **47** to the oil retaining portion **71** of the oil pan **61**. The first blowby gas passage **62** is defined separately from the first oil recovery passage **73**.

The lubricating device **70** further includes an oil pump **75** disposed in a halfway portion of the oil supply passage **72** and to be driven by the engine **9**, a third oil recovery passage **76** branching from a branch position disposed downstream of the oil pump **75** in the oil supply passage **72**, and an oil pressure control valve **77** disposed at the branch position.

The oil pressure control valve **77** defines and serves as a relief function of returning a portion of the lubricating oil in the oil supply passage **72** to the oil retaining portion **71** of the oil pan **61** via the third oil recovery passage **76** when the pressure of the lubricating oil has reached a set pressure or more. The pressure of the lubricating oil inside the oil supply passage **72** is thus maintained to be less than the set pressure.

The outboard motor **4** includes an engine gasket **78** and an oil pan gasket **79**. The engine gasket **78** is disposed between the engine **9** and the oil pan **61**. The exhaust guide **18** is disposed between the engine gasket **78** and the oil pan **61**. The oil pan gasket **79** is disposed between the exhaust guide **18** and the oil pan **61**. In the respective gaskets **78** and **79**, holes (which are not shown in FIG. **3** being a schematic view) through which corresponding oil, cooling water, and blowby gas are passed are respectively defined.

FIG. **4** is an exploded perspective view of an oil pan gasket and an oil pan, and FIG. **5** is a plan view of the oil pan. As shown in FIG. **4** and FIG. **5**, the oil pan **61** includes the oil retaining portion **71** located at an upper end portion thereof with an opening **71***a* opened upward. The upper end portion of the oil retaining portion **71** corresponds to an upper end portion **61***a* of the oil pan **61**. The oil retaining portion **71** is configured to retain lubricating oil to be supplied to at least the crank chamber **44**. The oil retaining portion **71** includes an outer wall surface **71***b* and an inner wall surface **71***c*.

The oil pan **61** includes a peripheral side wall **80** extending in the up-down direction, a bottom wall **81** coupled to a lower end portion of the peripheral side wall **80**, and a first partition wall **82** that defines the oil retaining portion **71** together with a portion **80***a* being a portion of the peripheral side wall **80** and a portion of the bottom wall **81**. A lower end portion of the first partition wall **82** is coupled to the bottom wall **81**. The first partition wall **82** includes a portion that defines a portion of the outer wall surface **71***b* of the oil retaining portion **71**, and a portion that defines a portion of the inner wall surface **71***c* of the oil retaining portion **71**.

As shown in FIG. **4** and FIG. **5**, the oil pan **61** includes a portion **25***a* being a portion of the main exhaust passage **25** extending downward from the engine **9**. That is, the outboard motor **4** includes an exhaust passage extending downward from the engine **9** through the oil pan **61**. The portion **25***a* of the main exhaust passage **25** is defined by being demarcated by a cylindrical second partition wall **83** extending up and down from the bottom wall **81** of the oil pan **61**.

As shown in FIG. **4** and FIG. **5**, the oil pan **61** includes a cooling water passage disposed along the outer wall surface **71***b* of the oil retaining portion **71**. Specifically, the oil pan **61** defines the cooling water supply passage **30** defining and serving as a cooling water passage disposed along the outer wall surface **71***b* of the oil retaining portion **71**. The inner wall surface **71***c* of the oil retaining portion **71** includes an adjacent portion **71***d* that is adjacent along the periphery of the cooling water supply passage **30** defining and serving as a cooling water passage. Specifically, as shown in FIG. **5**, the adjacent portion **71***d* of the inner wall surface **71***c* of the oil retaining portion **71** is disposed in an inner wall surface **82***a* of the first partition wall **82**, which constitutes a portion of the inner wall surface of the oil retaining portion **71**. The cooling water supply passage **30** is disposed around the portion **25***a* being a portion of the main exhaust passage **25** defining and serving as an exhaust passage. A portion of the cooling water passage is disposed between the oil retaining portion **71** and the exhaust passage. Specifically, at least a portion of the cooling water supply passage **30** (corresponding to a portion **30***a* of the cooling water supply passage **30**) is disposed between the oil retaining portion **71** and the main exhaust passage **25**.

As shown in FIG. **4** and FIG. **5**, the oil pan **61** includes a third partition wall **84** and a fourth partition wall **85** that respectively couple a portion **82***d* that defines the adjacent portion **71***d* in the first partition wall **82** and a portion **80***b* of the peripheral side wall **80**. Lower end portions of the third partition wall **84** and the fourth partition wall **85** are coupled to the bottom wall **81**. The portion **82***d* that defines the adjacent portion **71***d* in the first partition wall **82**, the third partition wall **84**, the fourth partition wall **85**, and the portion **80***b* of the peripheral side wall **80** are continuous so as to surround the periphery of the second partition wall **83**.

The portion **30***a* of the cooling water supply passage **30** is defined between a continuous body including the portion **82***d* of the first partition wall **82**, the third partition wall **84**, the fourth partition wall **85**, and the portion **80***b* of the peripheral side wall **80** and the second partition wall **83** surrounded by the continuous body. The portion **82***d* that defines the adjacent portion **71***d* in the first partition wall **82** is a partition between the portion **30***a* of the cooling water supply passage **30** and the oil retaining portion **71**. The second partition wall **83** is a partition between the portion **30***a* of the cooling water supply passage **30** and the portion **25***a* of the main exhaust passage **25**.

The oil pan **61** includes a portion **27***a* being a portion of the idle exhaust passage **27**. The portion **27***a* of the idle exhaust passage **27** is defined by being surrounded by a portion **82***e* of the first partition wall **82**, the third partition wall **84**, and a portion **80***c* of the peripheral side wall **80**. The portion **82***e* of the first partition wall **82** connects one end **82***h* of the portion **82***d* that defines the adjacent portion **71***d* and the portion **80***c* of the peripheral side wall **80**. The portion **82***e* of the first partition wall **82** is a partition between the portion **27***a* of the idle exhaust passage **27** and the oil retaining portion **71**. The third partition wall **84** is a partition between the portion **27***a* of the idle exhaust passage **27** and the portion **30***a* of the cooling water supply passage **30**.

The oil pan **61** further includes a portion **67***a* being a portion of the cooling water relief passage **67**. The portion **67***a* of the cooling water relief passage **67** is defined by being surrounded by a portion **82***g* of the first partition wall **82**, the fourth partition wall **85**, and the portion **80***d* of the peripheral side wall **80**. The portion **82***g* of the first partition wall **82** connects the other end **82***h* of the portion **82***d* that defines the adjacent portion **71***d* and a portion **80***d* of the peripheral side wall **80**. The fourth partition wall **85** is a partition between the portion **30***a* of the cooling water supply passage **30** and the portion **67***a* of the cooling water relief passage **67**. The portion **82***g* of the first partition wall **82** is a partition between the portion **67***a* of the cooling water relief passage **67** and the oil retaining portion **71**.

The oil pan **61** further includes a portion **33***a* being a portion of the cooling water discharge passage **33**. The oil pan **61** includes a fifth partition wall **86** that projects in an arch shape from a portion **80***e* of the peripheral side wall **80** to the oil retaining portion **71** side. The portion **33***a* of the cooling water discharge passage **33** is defined by being surrounded by the portion **80***e* of the peripheral side wall **80** and the fifth partition wall **86**. The fifth partition wall **86** is a partition between the portion **33***a* of the cooling water discharge passage **33** and the oil retaining portion **71**.

The oil pan **61** further includes an annular flange **80***f* that is provided at an upper end portion of the peripheral side wall **80** and projects toward the outer lateral side. The flange **80***f* defines a plurality of screw insertion holes **87** extending in the up-down direction and spaced at intervals therebetween. Also, the first partition wall **82** defines a screw hole **88** extending in the up-down direction and opened upward. The oil pan **61** further includes a steering shaft insertion hole **90** which penetrates through the oil pan **61** in the up-down direction and through which the steering shaft **8** is inserted. The oil pan **61** includes a sixth partition wall **89** that projects in an arch shape from a portion **80***g* of the peripheral side wall **80** to the oil retaining portion **71** side, and extends up and down. The steering shaft insertion hole **90** is defined by being surrounded by the portion **80***g* of the peripheral side wall **80** and the sixth partition wall **89**.

FIG. **6** is a schematic perspective view of the oil pan **61** with the oil pan gasket **79** set thereon. FIG. **7** is a schematic sectional view of the exhaust guide **18**, the oil pan gasket **79**, and the oil pan **61**, and shows a section cut along a vertical plane including line **700** in FIG. **6**. The vertical plane corresponds to a plane parallel or substantially parallel to a rotation axis of the steering shaft **8**. As shown in FIG. **4**, FIG. **6**, and FIG. **7**, the oil pan gasket **79** includes a shielding portion **91** configured to close-off and disposed in an oil recovery passage so as to be located over the opening **71***a* of the oil pan retaining portion **71**, and a guide hole **92** disposed in the oil recovery passage so as to be located over the inner wall surface **71***c* of the oil retaining portion **71**. The shielding portion **91** and the guide hole **92** are disposed inside the oil recovery passage (first oil recovery passage **73**) configured to recover lubricating oil in at least the crank chamber **44**. The oil pan **61** includes a portion **73***a* being a portion of the first oil recovery passage **73** configured to recover lubricating oil from at least the crank chamber **44**. The oil recovery passage preferably includes a portion **76***a* being a portion of the third oil recovery passage **76** and a portion being a portion (not shown) of the second oil recovery passage **74**, beside the portion **73***a* of the first oil recovery passage **73**.

The shielding portion **91** and the guide hole **92** are disposed inside the first oil recovery passage **73**, the second oil recovery passage **74**, and the third oil recovery passage **76** schematically shown in FIG. **3**. However, in FIG. **4**, FIG. **6**, and FIG. **7**, only the first oil recovery passage **73** and the third oil recovery passage **76** are shown. The oil pan gasket **79** constitutes a guide member configured to guide lubricating oil inside the oil recovery passages to the guide hole **92** by the shielding portion **91** and allow lubricating oil to flow down to the inner wall surface **71***c* of the oil retaining portion **71** from the guide hole **92**. That is, the guide member includes the oil pan gasket **79** that is provided with the shielding portion **91** and the guide hole **92** and is configured to contact the oil pan **61** between the engine **9** and the oil pan **61**. The oil pan gasket **79** defining and serving as a guide member is configured to guide lubricating oil inside the first oil recovery passage **73** and lubricating oil inside the third oil recovery passage **76** to the guide hole **92** by the shielding portion **91**, and allow lubricating oil to flow down to the inner wall surface **71***c* of the oil retaining portion **71** from the guide hole **92**. More specifically, the guide hole **92** is disposed over the adjacent portion **71***d* that is adjacent to the cooling water supply passage **30** serving as a cooling water passage in the inner wall surface **71***c* of the oil retaining portion **71**. As shown in FIG. **7**, the inner wall surface **71***c* of the oil retaining portion **71** is covered with a lubricating oil L**1** that has passed through the guide hole **92**.

As shown in FIG. **4**, the oil pan gasket **79** includes a main exhaust hole **93** that communicates with the portion **25***a* of the main exhaust passage **25** inside the oil pan **61**, and a plurality of water feed holes **94**, **95**, and **96** that communicate with the portion **30***a* of the cooling water supply passage **30** inside the oil pan **61** and take in the periphery of the main exhaust hole **93**. The main exhaust hole **93** constitutes a portion of the main exhaust passage **25**. The water feed holes **94**, **95**, and **96** constitute a portion of the cooling water supply passage **30**.

The oil pan gasket **79** further includes a plurality of idle exhaust holes **97** configured to communicate with the portion **27***a* of the idle exhaust passage **27** inside the oil pan **61**, a water feed hole **98** configured to communicate with the portion **67***a* of the cooling water relief passage **67** inside the oil pan **61**, and a drain hole **99** configured to communicate with the portion **33***a* of the cooling water discharge passage **33** inside the oil pan **61**. The idle exhaust holes **97** constitute a portion of the idle exhaust passage **27**. The water feed hole **98** constitutes a portion of the cooling water relief passage **67**.

The oil pan gasket **79** further includes a blowby gas vent hole **100** that constitutes a portion of the first blowby gas passage **62** schematically shown in FIG. **2** and FIG. **3**, and a plurality of screw insertion holes **101** that respectively communicate with the respective screw insertion holes **87** of the oil pan **61** shown in FIG. **4**.

The oil pan gasket **79** further includes screw insertion holes **102** that respectively communicate with the respective screw holes **88** of the oil pan **61**, and a steering shaft insertion hole **103** that communicates with the steering shaft insertion hole **90** of the oil pan **61**.

FIG. **8** is a plan view of the exhaust guide **18** disposed on the oil pan **61** via the oil pan gasket **79**. FIG. **9** is a bottom view of the exhaust guide **18**. FIG. **10** is a sectional view taken along line X-X in FIG. **8**, and FIG. **11** is a sectional view taken along line XI-XI in FIG. **8**. As shown in FIG. **8** to FIG. **11**, the exhaust guide **18** includes a block-shaped exhaust guide main body **104** and a flange **105** that projects from the exhaust guide main body **104** to the outer lateral side. As shown in FIG. **10** and FIG. **11**, the exhaust guide **18** includes an upper end portion **18***a* and a lower end portion **18***b*. The upper end portion **18***a* of the exhaust guide **18** is constituted by an upper end portion of the exhaust guide main body **104**. The lower end portion **18***b* of the exhaust guide **18** is constituted by a lower end portion of the exhaust guide main body **104**.

As shown in FIG. **3**, the upper end portion **18***a* of the exhaust guide **18** abuts against a lower end portion **40***a* of the cylinder body **40** and a lower end portion **43***a* of the crank case **43** via the engine gasket **78**. As shown in FIG. **3**, FIG. **10**, and FIG. **11**, the lower end portion **18***b* of the exhaust guide **18** abuts against the upper end portion **61***a* of the oil pan **61** via the oil pan gasket **79**. As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** includes a portion **73***b* being a portion of the first oil recovery passage **73**. The first oil recovery passage **73** is configured to lead lubricating oil from the crank chamber **43** to the inside of the oil retaining portion **71** of the oil pan **61**. The portion **73***b* of the first oil recovery passage **73** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **73***b* of the first oil recovery passage **73** includes an opening **731** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **732** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **76***b* being a portion of the third oil recovery passage **76**. The third oil recovery passage **76** is configured to lead lubricating oil from the oil pressure control valve **77** to the oil retaining portion **71** of the oil pan **61**. The portion **76***b* of the third oil recovery passage **76** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **76***b* of the third oil recovery passage **76** includes an opening **761** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **762** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **10**, over the shielding portion **91** of the oil pan gasket **79**, a guide space GS is disposed to guide lubricating oil flowing along the portion **73***b* of the first oil recovery passage **73** and the portion **76***b* of the third oil recovery passage **76** to the guide hole **92**. At least a portion of the guide space GS is defined between a portion to define amount support portion **110** of the exhaust guide to be described later and the oil pan gasket **79**. The opening **732** in the portion **73***b* of the first oil recovery passage **73** and the opening **762** in the portion **76***b* of the third oil recovery passage **76** are configured to communicate with the guide space GS. The lubricating oil L**1** that flows down onto the shielding portion **91** is, as shown in FIG. **11**, guided to the guide hole **92** by the shielding portion **91**, and flows down to the inside of the oil pan retaining portion **71**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **62***a* being a portion of the first blowby gas passage **62**. The first blowby gas passage **62** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **62***a* of the first blowby gas passage **62** includes an opening **621** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **622** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **25***b* being a portion of the main exhaust passage **25**. The portion **25***b* of the main exhaust passage **25** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **25***b* of the main exhaust passage **25** includes an opening **251** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **252** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **27***b* being a portion of the idle exhaust passage **27**. The idle exhaust passage **27** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **27***b* of the idle exhaust passage **27** includes an opening **271** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **272** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **30***b* being a portion of the cooling water supply passage **30**. The cooling water supply passage **30** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **30***b* of the cooling water supply passage **30** includes openings **301**, **302**, and **303** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **304** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **33***b* being a portion of the cooling water discharge passage **33**. The portion **33***b* of the cooling water discharge passage **33** communicates with the portion **33***a* of the cooling water discharge passage **33** provided in the oil pan **61**. The portion **33***b* of the cooling water discharge passage **33** is defined by a hole that penetrates through the exhaust guide **18** substantially in the up-down direction. The portion **33***b* of the cooling water discharge passage **33** includes an opening **331** defined in the upper end portion **18***a* of the exhaust guide **18** as shown in FIG. **8**, and an opening **332** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8** and FIG. **9**, the exhaust guide **18** further includes a portion **67***b* being a portion of the cooling water relief passage **67**. The portion **67***b* of the cooling water relief passage **67** communicates with the portion **67***a* of the cooling water relief passage **67** provided in the oil pan **61**. The portion **67***b* of the cooling water relief passage **67** branches from a branch position provided in a halfway portion of the portion **30***b* of the cooling water supply passage **30**. The portion **67***b* of the cooling water relief passage **67** includes an opening **672** defined in the lower end portion **18***b* of the exhaust guide **18** as shown in FIG. **9**.

As shown in FIG. **8**, the exhaust guide **18** includes a mount support portion **110** that supports the mount damper MD defining and serving as a mount. As shown in FIG. **12**, the mount damper MD defining and serving as a mount coupled to the steering bracket **22** is mounted and supported by the mount support portion **110**. As shown in FIG. **12**, the rear end of the steering bracket **22** includes a pair of branching portions **22***a* branching in a bifurcated shape toward the rear.

FIG. **13** is a sectional view taken along line XIII-XIII in FIG. **12**, and FIG. **14** is a sectional view taken along line XIV-XIV in FIG. **12**. FIG. **13** and FIG. **14** show a mounted state of the mount damper MD on the mount support portion **110**. As shown in FIG. **13** and FIG. **14**, the mount damper MD includes a metallic inner cylinder **111**, a metallic outer cylinder **112** surrounding the inner cylinder **111**, and an elastic member **113** including, for example, rubber interposed between the inner cylinder **111** and the outer cylinder **112** to couple the inner cylinder **111** and the outer cylinder **112**. The inner cylinder **111**, the outer cylinder **112**, and the elastic member **113** constitute a first mount element **114** including a rubber bushing. The mount damper DM includes a pair of the first mount elements **114**.

As shown in FIG. **12** and FIG. **13**, the mount damper MD further includes a first fixing screw **115** that fixes the inner cylinder **111** to the steering bracket **22** by being inserted through the inner cylinder **111** of each first mount element **114** and screwed and fixed into a screw hole **22***b* of the steering bracket **22**. The first fixing screw **115** includes a screw shaft **115***a* screwed into the screw hole **22***b* of the branching portion **22***a* of the steering bracket **22**, and a head portion **115***b* provided at one end of the screw shaft **115***a*. As shown in FIG. **13**, a common plate-shaped spacer **122** is interposed between the head portions **115***b* of the pair of first fixing screws **115** and end surfaces **111***a* of the respective inner cylinders **111**. Between the spacer **122** and end surfaces **22***c* of the respective branching portions **22***a* of the steering bracket **22**, the inner cylinders **111** are axially sandwiched and fixed. As shown in FIG. **12** and FIG. **14**, the mount damper MD further includes a second mount element **117** that is screwed to the mount support portion **110** by a plurality of second fixing screws **116** to fix the outer cylinder **112** of each first mount element **114** to the mount support portion **110**.

As shown in FIG. **8** and FIG. **14**, the mount support portion **110** includes a pair of receiving portions **118** that respectively receive the outer cylinders **112** of corresponding first mount elements **114**, and second receiving portions **119** that are disposed on both sides of the pair of first receiving portions **118** in terms of the left-right direction and between the pair of first receiving portions **118** in terms of the left-right direction and receive the second mount element **117**. As shown in FIG. **8**, the respective second receiving portions **119** include screw holes **123** into which corresponding second fixing screws **116** are screwed. As shown in FIG. **14**, the second mount element **117** includes three fastening portions **120** that are fastened using corresponding second fixing screws **116** to corresponding second receiving portions **119** of the mount support portion **110**, and curved clamp portions **121** each disposed between the adjacent fastening portions **120** to sandwich a corresponding first mount element **114** with a corresponding first receiving portion **118** of the mount support portion **110**.

According to the present first preferred embodiment, the following excellent effects are provided. That is, as shown in FIG. **7**, the outboard motor **4** includes a guide member provided with the shielding portion **91** disposed inside an oil recovery passage so as to be located over the opening **71***a* of the oil retaining portion **71** of the oil pan **61** and the guide hole **92** disposed inside the oil recovery passage so as to be located over an inner wall surface of the oil retaining portion **71**. Also, the outboard motor **4** includes a cooling water passage disposed along an outer wall surface of the oil retaining portion **71**.

Because cooling water thus contacts the outer wall surface **71***b* of the oil retaining portion **71**, the inner wall surface **71***c* of the oil retaining portion **71** is efficiently cooled, and maintained at low temperature. Lubricating oil is thus efficiently cooled. Also, lubricating oil that flows down toward the opening **71***a* of the oil retaining portion **71** is blocked by the shielding portion **91**, and guided to the guide hole **92**. Because the guide hole **92** is located over the inner wall surface **71***c* of the oil retaining portion **71**, the lubricating oil L**1** that has flowed down from the guide hole **92** flows down along the inner wall surface **71***c* of the oil retaining portion **71**. The lubricating oil L**1** is thus efficiently cooled by the inner wall surface **71***c* that is low temperature. Further, because the area of a portion exposed from the lubricating oil in the inner wall surface **71***c* of the oil retaining portion **71** decreases, the amount of water to be generated by condensation is significantly reduced. Here, the oil recovery passage includes a first oil recovery passage **73** configured to lead lubricating oil inside at least the crank chamber **44** to the oil retaining portion **71**. The oil recovery passage may include at least one of the second oil recovery passage **74** and the third oil recovery passage **76**, besides the first oil recovery passage **73**. The cooling water passage may include a cooling water supply passage **30**.

Also, the inner wall surface **71***c* of the oil retaining portion **71** includes an adjacent portion **71***d* located on the periphery of the cooling water passage (for example, the cooling water supply passage **30**), and the guide hole **92** is disposed over the adjacent portion **71***d*. Because lubricating oil that has flowed down from the guide hole **92** thus flows down along the efficiently cooled adjacent portion **71***d*, the lubricating oil is more efficiently cooled.

Also, because the adjacent portion **71***d* of the inner wall surface **71***c* of the oil retaining portion **71** is covered with lubricating oil that has passed through the guide hole **92**, the lubricating oil is more efficiently cooled. Because the area of a portion exposed from the lubricating oil in the inner wall surface **71***c* of the oil retaining portion **71** further decreases, the amount of water to be generated by condensation is significantly reduced.

Also, the passage of cooling water that is caused to flow along the outer wall surface **71***b* of the oil retaining portion **71** includes a cooling water supply passage **30** extending to the engine **9** from the water inlet **28** to be disposed in water, and disposed along the outer wall surface **71***b* of the oil retaining portion **71**. Because low-temperature cooling water before being used to cool the engine **9** thus flows along the outer wall surface **71***b* of the oil retaining portion **71**, the lubricating oil is more efficiently cooled.

Also, the outboard motor **4** includes an exhaust passage extending downward from the engine **9** through the oil pan **61**, and at least a portion of the cooling water passage is disposed between the oil retaining portion **71** and the exhaust passage. Low-temperature cooling water before being used to cool the engine **9** can thus cool both the lubricating oil in the oil retaining portion **71** and exhaust in the exhaust passage. Here, the exhaust passage may be a main exhaust passage **25** as in the example of FIG. **7**. It suffices that the exhaust passage includes at least one of the main exhaust passage **25** and the idle exhaust passage **27**. At least the portion of the cooling water passage that is disposed between the oil retaining portion **71** and the exhaust passage (at least one of the main exhaust passage **25** and the idle exhaust passage **27**) may include a portion **30***a* of the cooling water supply passage **30**. At least the portion of the cooling water passage that is disposed between the oil retaining portion **71** and the exhaust passage (at least one of the main exhaust passage **25** and the idle exhaust passage **27**) may further include a cooling water relief passage **67**.

Also, the guide member includes an oil pan gasket **79** that is provided with the shielding portion **91** and the guide hole **92**, and contacts the oil pan **61** between the engine **9** and the oil pan **61**. Thus, a simple design modification of the oil pan gasket **79** easily realizes a function as a guide member that guides lubricating oil inside the oil recovery passage so as to allow lubricating oil to flow down to the inner wall surface **71***c* of the oil retaining portion **71**.

Also, the outboard motor **4** includes a blowby gas passage (corresponding to the first blowby gas passage **62**) separate from the oil recovery passage (corresponding to the first oil recovery passage **73**), extending downward from the crank chamber **44** to the oil retaining portion **71**, to lead a blowby gas inside the crank chamber **44** to the inside of the oil retaining portion **71**. Thus, disruption of the flow of lubricating oil inside the oil recovery passage by a blowby gas the flow direction of which inside the crank chamber **44** tends not to be fixed in one direction due to the effect of the motion of the piston **37** of the engine **9** is significantly reduced or prevented.

Also, the outboard motor **4** includes an exhaust passage extending downward from the engine **9** through the oil pan **61**, and at least a portion of the cooling water passage is disposed between the oil retaining portion **71** and the exhaust passage. Low-temperature cooling water before being used to cool the engine **9** can thus cool both the lubricating oil in the oil retaining portion **71** and exhaust in the exhaust passage. Here, at least the portion of the cooling water passage may include a portion **30***a* being a portion of the cooling water supply passage **30**. It suffices that the exhaust passage includes at least one of the portion **25***a* of the main exhaust passage **25** and the idle exhaust passage **27***a*.

Also, the outboard motor **4** includes an exhaust guide **18** provided with a portion of the oil recovery passage, blowby gas passage, and exhaust passage, and disposed between the engine **9** and the oil pan **62**. Thus, simplification and downsizing of the structure is achieved by increasing functions served by the exhaust guide **18**. Here, it suffices that the oil recovery passage includes at least the first oil recovery passage **73** among the first oil recovery passage **73**, the second oil recovery passage **74**, and the third oil recovery passage **76**. It suffices that the exhaust passage includes at least one of the main exhaust passage **25** and the idle exhaust passage **27**. It suffices that the blowby gas passage includes at least one of the first blowby gas passage **62** and the second blowby gas passage **63**.

Also, the exhaust guide **18** includes amount support portion **110** on which a mount damper DM to be interposed between the hull H**1** and the outboard motor **4** is disposed. When the exhaust guide **18** with a mount damper DM disposed is disposed between the engine **9** and the oil pan **61**, it becomes less easy to flow lubricating oil from the engine **9** to the oil pan **61**. As a result, lubricating oil inside the oil pan **61** tends to become a high temperature. In contrast thereto, in the present first preferred embodiment, sufficient cooling performance is obtained by enhancing the cooling effect of lubricating oil inside the oil pan **61** by using the guide member.

Although the oil pan gasket **79** preferably constitutes a guide member, in the first preferred embodiment, the present invention is not limited to this arrangement, and for example, the guide member may include an engine gasket that is disposed between the engine and oil pan, an exhaust guide that is disposed between the engine gasket and oil pan, and an oil pan gasket, and the shielding portion and guide hole may be provided in any of the engine gasket, exhaust guide, and oil pan gasket. In this case, the degree of freedom of design is increased.

For example, as shown in a second preferred embodiment of FIG. **15**, the engine gasket **78**P preferably is provided with a shielding portion **91**P disposed inside an oil recovery passage **73**P so as to be located over an opening **71***a* of an oil retaining portion **71** and a guide hole **92**P disposed inside the oil recovery passage **73**P so as to be located over an inner wall surface **71***c* of the oil retaining portion **71**. The engine gasket **78**P constitutes a guide member that guides lubricating oil inside the oil recovery passage **73**P to the guide hole **92**P by the shielding portion **91**P and allows lubricating oil to flow down to the inner wall surface **71***c* of the oil retaining portion **71** from the guide hole **92**P. The lubricating oil from the guide hole **92**P flows down to the inner wall surface **71***c* of the oil retaining portion **71** through a passage **18**P**1** provided in an exhaust guide **18**P under the guide hole **92**P and over the inner wall surface **71***c* of the oil retaining portion **71**. Of the components of the second preferred embodiment shown in FIG. **15**, components that are the same as the components of the first preferred embodiment shown in FIG. **7** are designated by the same reference signs as the reference signs of the components of the first preferred embodiment shown in FIG. **7**.

Also, as shown in a third preferred embodiment of FIG. **16**, the exhaust guide **18**Q preferably is provided with a shielding portion **91**Q disposed inside an oil recovery passage **73**Q so as to be located over an opening **71***a* of an oil retaining portion **71** and a guide hole **92**Q disposed inside the oil recovery passage **73**Q so as to be located over an inner wall surface **71***c* of the oil retaining portion **71**. The shielding portion **91**Q is disposed over an opening **79**Q**1** of an oil pan gasket **79**Q. The exhaust guide **18**Q constitutes a guide member that guides lubricating oil inside the oil recovery passage **73**Q to the guide hole **92**Q by the shielding portion **91**Q and allows lubricating oil to flow down to the inner wall surface **71***c* of the oil retaining portion **71** from the guide hole **92**Q. Lubricating oil from the crank chamber flows down onto the shielding portion **91**Q through a passage **78**Q**1** provided in an engine gasket **78**Q and a passage **18**Q**1** provided in the exhaust guide **18**Q, and guided to the guide hole **92**Q. Of the components of the third preferred embodiment shown in FIG. **16**, components that are the same as the components of the first preferred embodiment shown in FIG. **7** are designated by the same reference signs as the reference signs of the components of the first preferred embodiment shown in FIG. **7**.

While preferred embodiments of the present invention have been described above, it is to be understood that variations and modifications will be apparent to those skilled in the art without departing from the scope and spirit of the present invention. The scope of the present invention, therefore, is to be determined solely by the following claims.

The present application corresponds to Japanese Patent Application No. 2013-232396 filed in the Japanese Patent Office on Nov. 8, 2013, and the entire disclosure of this application is incorporated herein by reference.

What is claimed is:

1. An outboard motor comprising:

an engine including a crankshaft configured to be rotatable about a rotation axis extending in an up-down direction, and a crank chamber that houses the crankshaft;

an oil pan that includes an oil retaining portion provided at an upper end portion thereof with an opening opened upward, and that is disposed under the engine and configured to retain lubricating oil to be supplied to at least the crank chamber inside the oil retaining portion;

a cooling water passage disposed along an outer wall surface of the oil retaining portion;

an oil recovery passage that extends downward from the crank chamber to the oil retaining portion and is configured to lead lubricating oil inside the crank chamber to an inside of the oil retaining portion; and

a guide member that is provided with a shielding portion disposed inside the oil recovery passage so as to be located over the opening of the oil retaining portion and a guide hole disposed inside the oil recovery passage so as to be located over an inner wall surface of the oil retaining portion, and that is configured to guide lubricating oil inside the oil recovery passage to the guide hole by the shielding portion and allow lubricating oil to flow down to the inner wall surface of the oil retaining portion from the guide hole.

2. The outboard motor according to claim **1**, wherein

the inner wall surface of the oil retaining portion includes an adjacent portion located on a periphery of the cooling water passage; and

the guide hole is disposed over the adjacent portion.

3. The outboard motor according to claim **2**, wherein the adjacent portion of the oil retaining portion is covered with lubricating oil that has passed through the guide hole.

4. The outboard motor according to claim **1**, wherein the cooling water passage includes a cooling water supply passage extending to the engine from a water inlet to be disposed in water and disposed along the outer wall surface of the oil retaining portion.

5. The outboard motor according to claim **1**, further comprising an exhaust passage extending downward from the engine through the oil pan, wherein

at least a portion of the cooling water passage is disposed between the oil retaining portion and the exhaust passage.

6. The outboard motor according to claim **1**, wherein the guide member includes an oil pan gasket that is provided with the shielding portion and the guide hole and is configured to contact the oil pan between the engine and the oil pan.

7. The outboard motor according to claim **1**, further comprising a blowby gas passage that is separated from the oil recovery passage and extends downward from the crank chamber to the oil retaining portion, and is configured to lead a blowby gas inside the crank chamber to an inside of the oil retaining portion.

8. The outboard motor according to claim **7**, further comprising:

an exhaust passage extending downward from the engine through the oil pan; and

an exhaust guide provided with a portion of the oil recovery passage, the blowby gas passage, and the exhaust passage, disposed between the engine and the oil pan.

9. The outboard motor according to claim **7**, wherein the exhaust guide includes a mount support portion on which a mount damper to be interposed between a hull and the outboard motor is disposed.

10. The outboard motor according to claim **1**, wherein

the guide member includes an engine gasket disposed between the engine and the oil pan, an exhaust guide disposed between the engine gasket and the oil pan, and an oil pan gasket disposed between the exhaust guide and the oil pan; and

the shielding portion and the guide hole are provided in any of the engine gasket, the exhaust guide, and the oil pan gasket.

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